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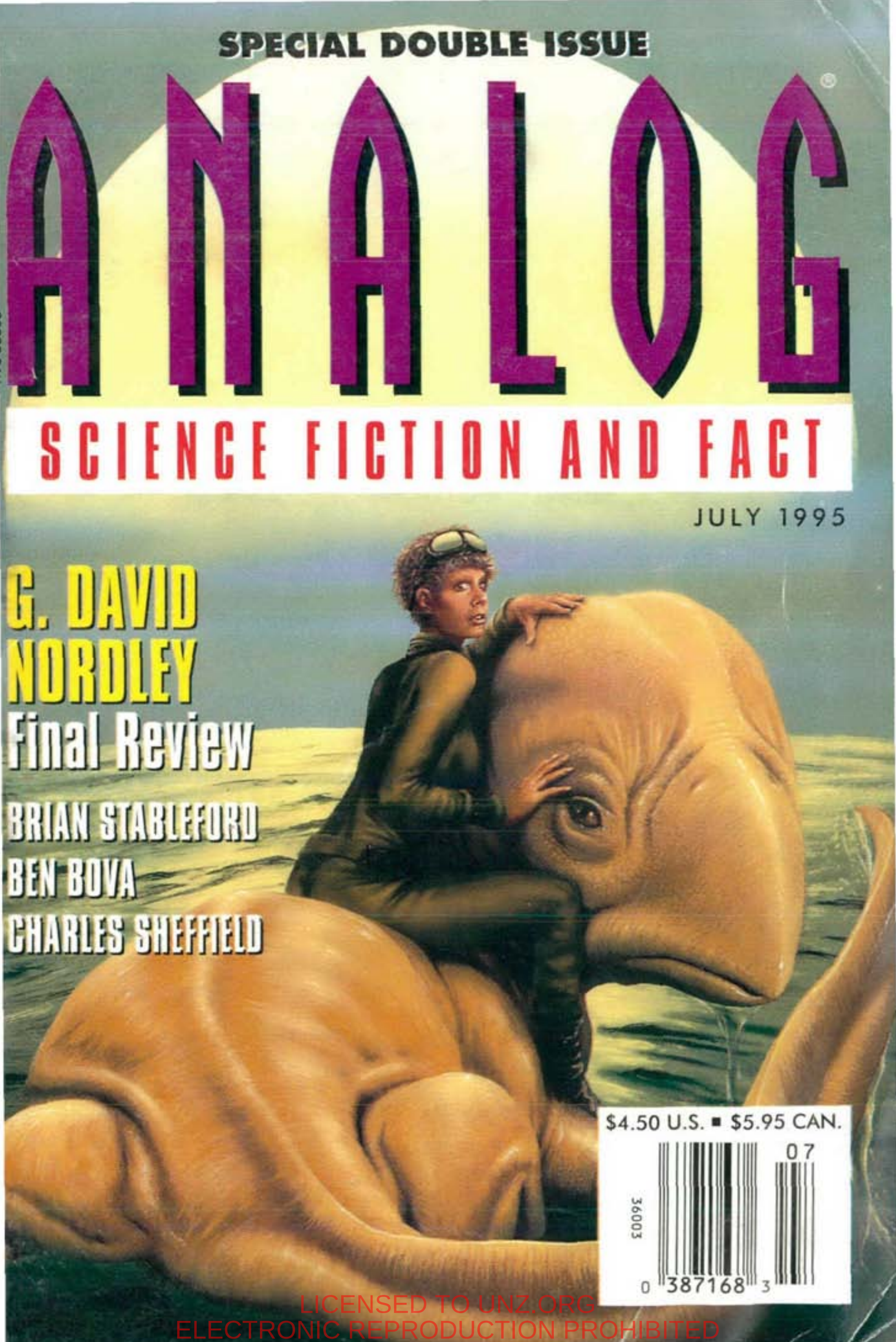

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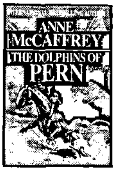
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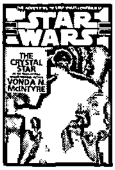
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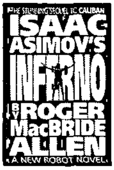
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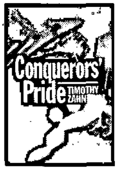
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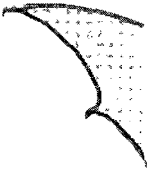

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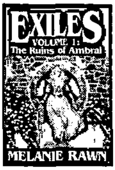
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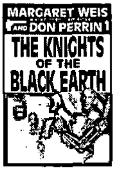
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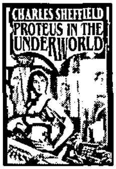
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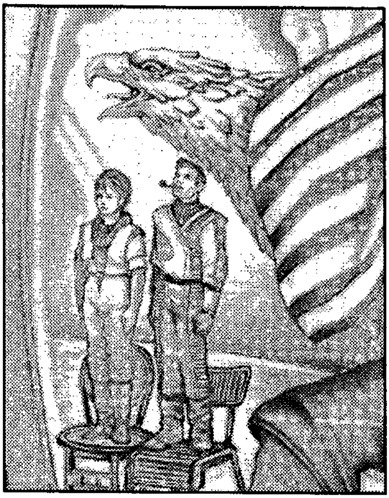

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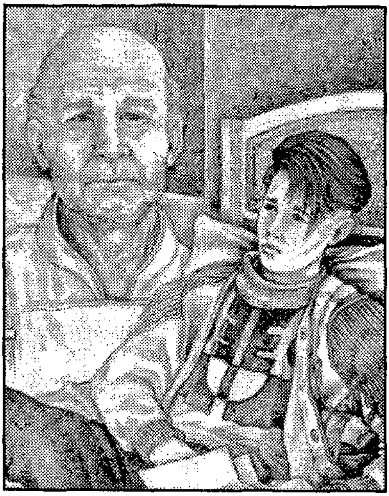

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EDITORIAL Stanley Schmidt

DEATHWATCH FOR FREEDOM

Freedom has never been a popular idea, and it seems less so now than at any time in my personal memory. Oh, people have long *talked* about it; and they still do, perhaps more in July than at any other time. So maybe this is a good time for me to talk about it, too.

Actually, even the talk seems less now. These days we are less likely to hear about "freedom" or "liberty" than about "rights" and "entitlements" and "political correctness." When freedom *is* mentioned, it is more likely because the speakers want to be sure *they* have it than because they want to be sure *other* people have it. There's nothing new about that, but it does show that while the *word* has sometimes been in vogue, many people have never really grasped what it *means*. Or, if they did, that they never felt comfortable with the idea—because of a key ingredient that seems to have been forgotten in the shrill chorus of "political correctness."

Freedom, in a civilized society, has never meant freedom to do absolutely anything one might wish. There have to be limits, perhaps best summed up in the old saw, "Your freedom to swing your arm ends where my nose begins." The strength of a few societies, including ours through much of its history, lay in recognizing the importance of not imposing a plethora of additional and arbitrary restrictions. You may not swing your arm so it punches me or anyone else in the nose or destroys our property, but you may swing it all you like as long as you *don't* hurt anyone else or their belongings. In particular, you may swing it in a way that hurts *you* as long as it does not hurt anyone else. It is up to *you*, not me or the government, to decide what's in your best interests—even if we think you're making a mistake.

That principle is *essential* to a society that would maximize all its members' opportunities for "the pursuit of happiness." Since we cannot all agree on The Best Way to Live, we dare not impose our preferences on others to any greater extent than *necessary* to prevent people from inflicting clear injury on others. Nor do we dare tolerate such imposition of preferences *by* others.

Threats to freedom can come from two main sources, both in plentiful supply lately. The obvious one is government getting out of hand. Last September, according to a local newspaper report, a combination of local and federal officials conducted door-to-door searches of all the houses in a Louisiana neighborhood—without warrants for most of them—while police patrols and an overhead helicopter kept anyone from entering or leaving the area, ostensibly as a crackdown on drug dealers and gangsters. Federal officials were quoted as considering this "a model for what we can do throughout the nation." Near the same time, a town in New Jersey exercised its infinite wisdom by outlawing profanity in public places.

I have no idea how the town fathers proposed to enforce this ban; I can only be sure that enforcement would be spotty and in any case indefensible. This is the kind of law that we laugh at when we hear that it's still on old books (though unenforced) somewhere—yet here is a government *creating* such a law *now,* and trying to enforce it. That is no laughing matter. Neither is a multijurisdictional force taking over a neighborhood and treating all its inhabitants like criminals, with no attempt at due process. The neighborhood may have had severe crime problems that needed to be solved—but are we ready to consider that an acceptable way to solve them?

The less obvious, but no less ominous, threat to freedom comes not from government actions, but from the society itself. A large portion of ours now *does* seem ready to accept gestapo-like tactics to ensure Law and Order (provided, of course, that they're only applied to other people). Even more insidiously, our culture has become thickly infested with people who are quite sure how everyone else should live and are prepared to act on their own to bring them into line, by whatever means they can. Not all tyrants are governments; an intolerant society can be every bit as tyrannical. And we are rapidly becoming an extremely intolerant society—ironically, in the name of tolerance.

That's what the whole "political correctness" movement seems to be about. Various pressure groups have taken it upon themselves to insure

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that this or that "victim" group, such as women or blacks or Jews, are not made to suffer because of intolerance. An admirable idea, in principle; but in practice, regrettably and alarmingly, it has turned out to mean becoming very intolerant, and trying to make everyone else very intolerant, of an absurdly wide range of speech and action. It seldom seemed to occur to anyone that the extreme measures being advocated to protect sexual or racial groups from sexism or racism were themselves blatantly sexist and racist.

At first I thought it was funny, in a sick sort of way. Obviously the more extreme proponents of such views were irrational fanatics, not to be taken seriously. I could listen to them, evaluate what they had to say, and ignore them if they didn't make sense. I stopped laughing when I realized that lots of people *were* taking them seriously—including some in exceedingly surprising and influential places.

Universities and colleges have a long tradition of being, of all parts of our society, perhaps the most open to original and controversial thought—which any society needs to keep from getting pinched by its own blinders. Academic freedom has been regarded as the very bedrock of what universities are for; the institution of tenure, despite its drawbacks, exists primarily to ensure it. The American Association of University Professors long devoted a sizable part of its efforts to protecting its members against efforts to chip away at academic freedom.

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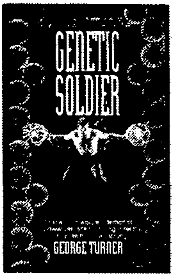

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Lately, though, the AAUP has been oddly quiet in the face of threats that I would have found hard to imagine being suggested, much less practiced and accepted, when I was professing (not that many years ago). Case after case has been brought to my attention, not of somebody standing on a soapbox spouting nonsense to passers-by who could walk away, but of professors being intimidated or driven out of their careers on the flimsiest and most ridiculous pretexts. My space limitations here don't let me go into details, but I can mention a few instances and some sources where you can start following them up if you want to.

Ian Maitland's article "How the University of Minnesota Was Subverted by Litigation," in *Academic Questions* for Winter 1992-3, tells of a professor who sued the university, claiming that she didn't get a tenure-track appointment because she was a woman. The university, instead of defending itself, settled out of court without admitting discrimination, and announced a new policy of giving hiring *preference* to women. Barry Gross's "Salem in Minnesota," in the Spring 1992 issue of the same journal, deals with an entire department faculty being harassed for several months because of "sexual harassment" charges brought—anonymously—by four students. The alleged offenses included disagreeing with a student about the role of a female character in a story, assigning reading lists that the students didn't like, and giving bad grades.

Another 1992 sexual harassment case centered on Allan Mandelstamm, a popular and successful teacher of large classes at Virginia Polytech who happened to use some ribald humor in his lectures (see "Lessons from the Mandelstamm Case," by Henry Bauer, *Academic Questions*, Spring 1992). Mandelstamm was rated very highly by almost all his students, but was driven to resign in disgust when the administrators made his life miserable after approximately 1% of his female students complained that they found his humor offensive. (They ignored the 99% who, when asked, said they didn't.)

What have we come to when universities, the traditional bastion of free speech even when none can be found elsewhere, take this sort of thing seriously and professors put up with it? What we've come to, apparently, is a state where people who should certainly know better have let themselves be bullied or brainwashed into believing a lot of dangerous nonsense. Nonsense like the idea that people *should* be identified primarily by the groups that they happen to belong to; that they are automatically entitled to compensation as "victims" merely for belonging to those groups; that they have an innate and unalienable right not to be offended; and that the mere fact that someone *claims* to be offended proves that someone else did something that demands punishment.

And if it can happen *there*, how safe is the country at large?

Not very. In academia, the watchword seems to have become, "If anyone takes offense, the offender must

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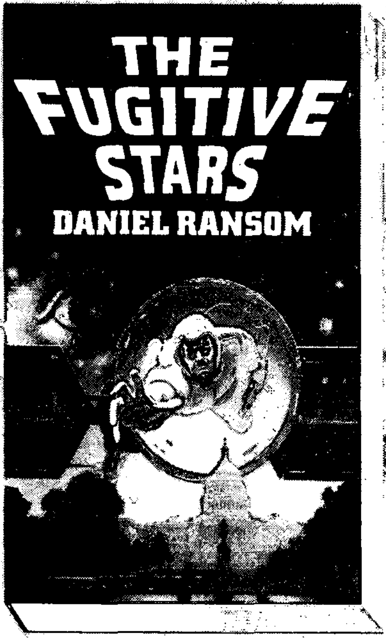

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be punished." After several years of reading this magazine's mail, I can assure you that *someone* will take offense at *anything* you say. So if the possibility of giving offense, no matter to how few, is permitted to justify censorship or punishment, then none of us is safe. As reader W.F. Salkind astutely observed, "I have read the Constitution carefully, and nowhere in it do I find a guarantee of Freedom from Being Offended. Indeed, such a guarantee would be incompatible with freedom of expression."

In the country at large, which has even less understanding of the concept or value of freedom than academia, the stamping out of freedom is well underway. It has become socially acceptable, and encouraged, to feel virtuous about meddling in other people's personal habits—or at least those that happen to be currently fashionable targets. Perhaps the best recent example is the antismoking movement, which has in a few years gone from what was widely perceived as a "lunatic fringe" to "the wave of the future." As a nonsmoker who recognizes the dangers of second-hand smoke, I must confess I welcome the increased prevalence of smokefree environments—but I can't condone the current fashion for trying to browbeat smokers into feeling guilty even if they light up an occasional smoke where it can't possibly bother anybody else.

I recently heard a prediction that in fifty years drinking alcohol or eating red meat will be as scorned as smoking is now. Alcohol, like smoking, is a *somewhat* special case because of the problems it can cause to non-users—but it's also possible for many people to use it *without* those problems. There must be better ways to avoid them than to try to pressure everyone into becoming just like the loudest teetotalers. If you personally have no interest in either tobacco or alcohol, there is surely something *you* like that doesn't hurt anyone else but someone else thinks you shouldn't do. How soon till they come after *you?*

There's the rub: the key ingredient of freedom that people are forgetting. *To mean anything at all, freedom* has *to include the freedom to do even things that you or I or anyone else doesn't like.* Only if it poses a real danger of harm to someone else—and I mean clear, undeniable *harm,* not just offense to the easily offended—are we justified in restricting that freedom. Even then, we are justified in no more restriction than needed to remove the danger—which seldom requires an absolute ban.

I'm by no means the first to make this observation, but I'm beginning to fear I'm one of the few who remembers. It's so important that I'll repeat it in some others' words, in case mine didn't register. Thomas Paine: "He that would make his own liberty secure must guard even his enemy from oppression; for if he violates this duty, he establishes a precedent that will reach to himself." William Allen White: "Liberty is the only thing you can't have unless you give it to others." Harry Emerson Fosdick: "Liberty is always dangerous, but it is the safest thing we have."

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Think about it. Put it in your *own* words. Do whatever it takes to make yourself *realize* it, and to grasp its importance—before it's too late.

This is not the first time the concept of freedom has been in such danger. It emerged, eventually, from such earlier threats as McCarthyism, and it may be able to weather the current storm, too.

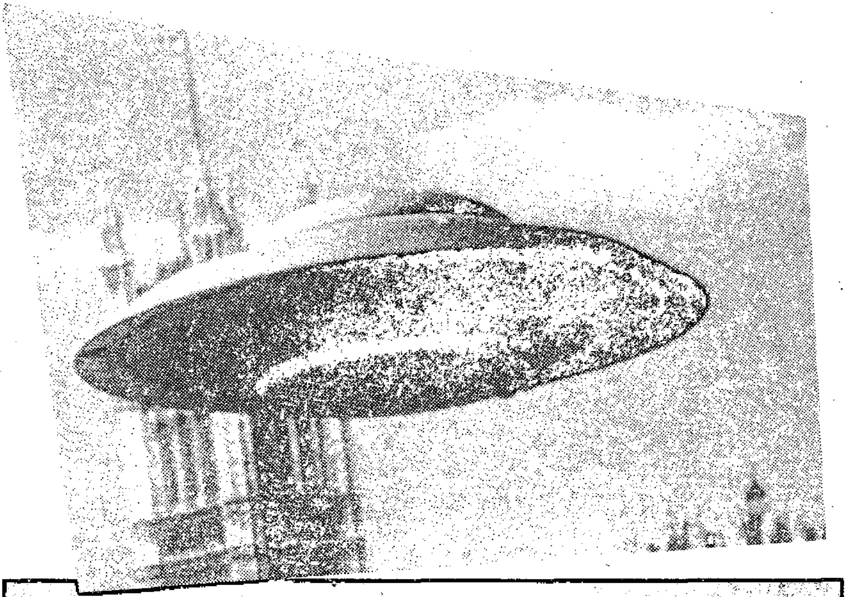
But we don't dare take it for granted. As Thomas Jefferson said, "Eternal vigilance is the price of liberty." But it's not enough just to be vigilant. You have to remember what you're watching for—and why. ■

IN TIMES TO COME

Some stories provide more fuel than others for an artist's imagination, and by now you've probably noticed that Ben Bova's *Orion Among the Stars* is of the high-octane persuasion. We originally asked George Krauter for one cover, to go with Part 1; but when he read the story, it so fired his imagination that he asked if he could do another one for the conclusion, which just happens to appear in our August issue. He showed us a sketch of what he had in mind, and we told him, "Go for it!" We think you'll agree—and if you've had the feeling at this point that this yarn was fantasy instead of science fiction, we also think this part will lay such thoughts firmly to rest.

Doug Beason's fact article shows you another player in the current trend toward finding new ways back into space. This one is a little thing called Clementine, an observant little satellite launched recently—and quietly, cheaply, and rewardingly—into orbit around the Moon.

Naturally we also have a goodly assortment of shorter fiction, including a couple of rather special attractions. Need I tell you more than the title of Harry Turtledove's "The Maltese Elephant"? And "Microbe" marks the first *short* fiction appearance by biologist and writer Joan Slonczewski, who has created a stir among both critics and general readers with her novels.



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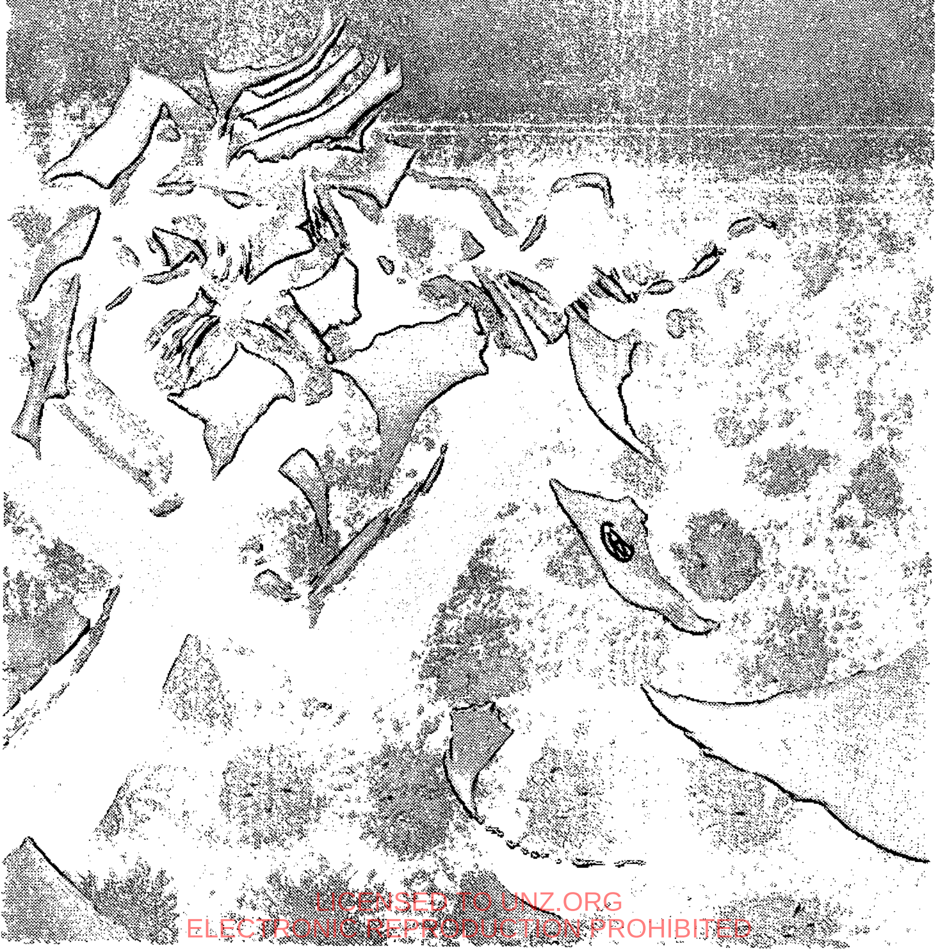
G. David Nordley

FINAL REVIEW

If a society is an organism that evolves, it must also mutate, eat, and eliminate waste.

Illustration by Alan M. Clark



I have lived to see the language of a small, off-the-flightway island on a most unlikely, high-gravity, thin-atmosphere, ultraviolet-blasted planet become the native language of beings whose ancestors came from normal worlds a hundred light-years away. I have also seen Kleth base eight arithmetic replace the base twelve and base ten systems of Do'utia and Earth because it is reasonable. And I have seen our public architecture soar, of necessity, to Do'utian scale. So there is much that is unique, improbable and precious about Trimus! But that Trimus speaks English is what I think of whenever I fancy that the evolution of history follows any ordained pattern.

—Go Zom's notes on the Compact and Charter of Trimus.

It was all Monitor Commander Drinnil'ib could do to keep his only slightly overweight mass of Do'utian muscle and blubber calm on his reserved pad in the cozy, by Do'utian standards, Trimus University auditorium. Everyone said that his "Memoirs of a Planet Monitor" was a solid, if unexciting, favorite for the non-fiction award, but his tail would grow no longer with a display of eagerness.

The Human master of ceremonies, Richard Moon, was a bright new humorist with a bushy blond mane around his head who'd won the non-fiction award last year. He, Drin remembered, won it for "The Flying Whale," an account of balloon-borne anthropologist Doglosha'idn's gargantuan adventures above the Kleth-settled outer pole of Trimus. Richard Moon was saying something intended to be funny, but Drin's attention was elsewhere.

His friend and frequent partner, Monitor Lieutenant Mary Pearce, sat on the edge of his pad, and playfully nudged his head back and forth to distract him. Was his agitation that obvious?

He nudged her back, gently. It would take six of the tiny humans, laid from foot to head, to equal his length. But in crowded places, she was much more mobile and, for her size, surprisingly strong—she moved his massive beak with relative ease. This was the genetic heritage of a high-gravity planet reinforced by the rigorous Monitor training regimen, Drin reflected, glad for something to distract his thoughts. The waiting was torture.

Mary's touch comforted him and, in an exotic way, excited him. In the privacy of his mind, he let himself savor that. They both had open, curious minds and a deep affection for each other having saved each other's lives more than once. In the course of these years together, had touched in ways that more conservative Do'utians would find difficult to accept. His worries about this were getting increasingly easier to handle—but he was careful, very careful, about what he let beyond the beak.

Drinnil'ib had no wives, no beachhold, and played the rogue in Do'utian society—but his people could easily smell the difference between his contentment and the need of an unbeached bull looking for a challenge. Someone, or something, was filling that role in his life—and the scent of that made the Do'utian men he dealt with a little less defensive, especially those who fancied themselves minor beachmasters. His problem was with uncowed Do'utian women who hinted from time to time that they wished to join his nonexistent harem. Drin avoided mating, however, having had nothing but bad experiences in that part of life. If his feelings for Mary helped him avoid that, so be it. It was a private matter.

At last the crowd hushed and the award presenter, noted critic and personality Zo Kim, glided in over them and settled on stage with what passed for dignity in a Kleth—a couple of precise beats with his jet black wings and a firm two point landing with barely a hop. He was alone—a Kleth that liked to live on the edge. By reports, his mate, Bi Tan, was still on the outer pole, working on her next romance. She was well known for not carrying a comset, for reasons both Kleth and writers might understand.

Highly agitated, Zo Kim approached the master of ceremonies.

Moon wasn't laughing now, though. In fact, as far as Drin could tell, the human looked honestly horrified. Was he refusing to give the presenter the envelope? Drin stifled himself—that might be *his* award. Zo Kim's review of Drin's book had been scathing, as had been his review of Moon's. The stylistic pollution of this posturing pundit had been tolerated by the community because he could read so much and at least distill the current of content with some accuracy between ill chosen adjectives. After two centuries, toleration had become a kind of grudging, institutional respect. Perhaps Moon, despite his demeanor, was simply tweaking the tail of the too-pompous critic.

"You know, and I will know *now!*" Zo Kim shouted at Moon, lifting himself off the stage with a flap of anger to be head high with the human.

Cut the comedy, Drin thought, *I want to know too!*

"Very well," Moon answered, barely audible, his posture one of defeat, not challenge. What, Drin wondered, was wrong? "It is your right to know. I was told of Bi Tan's end by . . . someone I trust, I did not see it myself, but . . . I have no reason, myself, to doubt the report. But that, of course, does not mean the report is true. There may be a mistake, Zo Kim. I suggest you don't be convinced without seeing the body."

"You try to hide this from me just so that I can live long enough to present an award? For some mediocre Monitor's stinking salacious pandering sadography?"

Sadography? OK, Drin thought, so he hadn't pulled any punches about the time a primitivist harpoon had gone through Mary's leg into his back. Occasional violence was a fact of monitor life, but something totally outside the experience of most citizens of Trimus, and he had not quite been prepared for the reaction, either in interest and in vituperation. But, wait a minute—had Zo Kim just said that he'd won? The tip of Drin's tail lifted off his mat in anticipation.

Zo Kim snatched the envelope

from poor Moon's hand, tore it three times with the incredible quickness of the Kleth, and threw the pieces like so much confetti out from the stage. Now Drin was on his feet, both hearts pounding. Pollution! Why this? The hall resounded with rumbles, whistles, and gasps.

Then, in one horrible second, Zo Kim's behavior made sense to Drin, like the sonic image of an iceberg resolving itself right in front of him where he'd been expecting a school of fish. Bi Tan's end? Someone had just told Zo Kim that his mate had died. In the Kleth and their close relatives, the death of a mate triggered an involuntary, emotional loss-driven process whereby the remaining mate could both defend and feed its young, for a day or two. It happened whether they had young or not—Kleth were mated for life from hatching and could not mate again. It was as if the two were one organism, but in Zo Kim's case. . . .

"Drop dead!" a human voice yelled. Someone else probably hadn't figured it out yet. Drin located the voice—a black-bearded man, short even by human standards, but stocky and strong looking. Gorman Stendt—Drin knew him by reputation—an author of heroic human space adventures who illustrated them with intricately detailed working models of imagined alien technology, working aircraft, war machines, cities and space stations, all rendered at micro scale. They floated or crawled around you as you listened to the narrative. He had an unlinked cybernetic system at his farm, eight-squared macrounits out of Trimus City, so each new work was a genuine surprise. His manners, Drin surmised, must have suffered from his isolation.

Zo Kim had recently excoriated Stendt's historical novel concerning the first Kleth-Human contact as chauvinist, overdetailed, and boring. Its length was over four dimacrobytes and Drin had not had time to experience it yet—so Zo Kim may have been right—not that that mattered anymore.

Drin touched his beak to his mat. This was tragic. And suppose that Zo Kim's information was wrong? Or worse—false? Drin's professional interest was triggered by the thought, and he fixed an eye on Richard Moon. Pretending to be reluctant? He discreetly slid his tongue out of the corner of his mouth, slipped a branch into his ventral pouch, and triggered the alert on his comset. Mary, Do Tor and Go Ton, and any other monitors present would feel the low frequency signal and start paying attention, if they weren't already.

"You and your spies and your claque can drop dead!" Stendt yelled at Zo Kim, still apparently ignorant of what was happening to the Kleth.

"Right on!" a Do'utian woman added.

"Shut your beak!" another human added—Drin couldn't tell if at Zo Kim or his detractors.

This shouldn't happen here, in public, Drin thought—a spectacle utterly at odds with the Compact's goal of interspecies amity. Perhaps he could delay Zo Kim's demise—move it out of view.

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"Silence!" Drin finally roared. "Zo Kim, things may not be what you think! Hold onto that thought. You are not complete, you and Bi Tan have things to do. At least let the monitors investigate this rumor—you have enemies. It may be a lie, and if you let yourself believe it, you'll kill her, too!"

The whispers hushed, as from perches, chairs, and pads, the audience realized what was about to occur. Stendt and the others, Drin thought, would wish to call their words back the rest of their lives—for drop dead was what just what Zo Kim was about to do.

The Kleth leapt to the podium in a single bound, already visibly trembling. The need for a Kleth to die when his or her mate died, and whatever assistance he or she is given, was normally a very private matter, not a public spectacle. But there had never, ever, been anything normal about Zo Kim.

"No, you phony. I know, now, that Bi Tan is really dead," Zo Kim declared, shaking with an almost manic intensity. "Richard Moon is incapable of credible fantasy."

Despite everything, a scattering of dry spouts, laughs, and chatters filled the hall. Zo Kim would go out like Don Giovanni, Drin decided. Unrepentant.

But Zo Kim had a surprise even there. "I suspected for days, but hung on in the balance as my body prepared itself—it will end quickly now. Well, everyone, whatever little merit she had as a mate or an author matters not now. Bi Tan was mine and, observe everyone, my destiny is to go with her." Zo Kim's wings raised in an unbalanced, almost involuntary spasm. He would not fly again. "I note that while there are two-eights and one of Bi Tan novels, there are none of Zo Kim. So she will fly higher in history despite my superior wit and literary sense. What irony!"

Zo Kim's head jerked from side to side. The Kleth's wings went out and in, restlessly. "What irony! My body has begun to prepare itself to feed the nestlings we never had because of Bi Tan's career. It is now far too late for me to join the debate about engineering this out of our species, so please watch the effects for a while with whatever curiosity you may possess." Zo Kim gave a horrid little cackle, both high and low pitched. "Become edified as I become putrefied! Consider it as performance art! I will have my fame, too!"

Did self-digestion trigger self-loathing? It might make some evolutionary sense, Drin thought, as an abandonment of all urge to self-preservation. With such analytical thoughts, he tried to put some emotional distance between himself and the awful thing happening in front of him.

"Yes, friends, it looks painful and it is," Zo Kim continued, his dry intellect seemingly unaffected by what was happening to his body, "but the pain is curiously comforting. Drin-nil'ib, you sterile, clinical, mannered murder detective: look, learn, and put a little sense of the horror of this in your next one. Eh?"

Drin rocked forward, his four powerful webbed claws digging into his pad, speechless now.

Zo Kim's wings snapped in and out, and his head back and forth. "What a show, everyone! But I am getting bored now. Will someone help me end this? Someone with a little style? Do Tor and Go Ton, your *execrable* contributions to Drinnil'ib's mindless horror at least had the minor virtue of being interesting. Would you? Please?" This was followed by some almost intelligible Kleth dialect.

Drin rolled an eye toward Kleth Monitors Do Tor and Go Ton, frequent collaborators in real life as well as popular history. In fiction, Go Ton swam in the currents of classic Kleth air-battle, sounded in multilevel free-verse, and had achieved some minor success, at least in terms of the number of downloads from the Trimus net. Enough success, it seemed, to attract Zo Kim's withering attention.

Go Ton, characteristically ignoring her own treatment at Zo Kim's beak, had earlier fumed to Drin about the extremity of personality defect required for a Kleth to be rejected by even its own mate. Even being apart for a few hours was risky for Kleth; living apart was a fatalistic, almost nihilistic act—and Drin was seeing the results of it now.

Do Tor, seated with his bright yellow mate, had been silent about Zo Kim's insults, but now he flew up and lit about half a charter unit from the dying critic and came no closer.

"Calm down, Zo Kim. Shouting and fighting makes it faster and worse. You need to clean your nest one last time. Could you say something good about *The Last of the Air* first?"

"No!" shouted Zo Kim, his crest snapping erect.

Do Tor simply stood there. Kleth had different feelings about suffering. And death.

By the compact, Drin thought, Do Tor had reason to let Zo Kim suffer, but this was unseemly—the Kleth monitor was cutting his tail for a transitory revenge. How long was this going to go on? There were tales in legend of Kleth who had, by force of will, lasted as long as a Trimus week. Drin slipped his tongue out the corner of his beak and down into his ventral pouch. The hand on the left branch of his tongue found his gun and changed the load by feel—self-guiding darts, short ones for Kleth. He could double-check the gun's audio display in a second when he had it out.

No, it wouldn't do. Zo Kim was alone on the stage, and while he could probably lock on from here and deliver the euthanasia, probably wasn't good enough in a crowded room.

"Mary," Drin said softly. "Get your piece. It wouldn't look right—if I did it."

Mary nodded and raised her many-curved body with ever-fascinating, seemingly boneless fluidity. She drew her gun from her belly kit, loaded the nerve poison clip, and sprinted toward the stage. She seemed to almost fly, though her feet had to strike the aisle every half charter unit or so.

But Zo Kim himself broke the impasse. "I can't say anything good about it, Do Tor, because I haven't read it! Have mercy—I cannot fly.

Look, the stage below me is stained! Isn't that interesting, everyone? I am leaking! I am becoming very digestible, right before your eyes!"

Someone actually laughed—indigestible was a word Zo Kim often used to great effect in his critiques. He was clearly in agony with his morbid not-pain, but his brain would be the last thing affected, and he would probably be able to critique the process almost to the last, cutting and ironic as if by some unconscious mental reflex. Drin shuddered.

A putrid smell reached Drin. How long, he thought, could we, the arguable intellectual elite of three species who together have traveled the stars long enough to reach halfway to the core of the Galaxy, sit here and watch this?

Finally, Do Tor acted—apparently, the lack of a negative review was enough. With breathtaking quickness, his mouth was at Zo Kim's offered throat. The latter shuddered, made one last reflexive flap of his mottled brown wings, and was still.

Mary reached the stage as someone belatedly told the curtains to close, and over her Monitor's comset Drin heard Do Tor say, softly, "Tastes very sweet."

"Richard Moon," Mary called. Yes, of course, Drin thought as the fog of horror lifted from his brain, standard procedure called for an interview with whoever told a Kleth that their mate was dead, though obviously it had been the last thing Moon had seemed to want to do.

The shocked audience started, on its own, to leave its seats, pads and perches for the clean air outside, as silent as the dead themselves. Death was rare on Trimus, and when it happened it was almost always a fatal accident in some remote area, or the very private suicide of someone who had come to feel their time in the Universe was complete. This was unprecedented—the most private moment one could imagine of a sentient being turned into an awful public spectacle. An accident? Zo Kim was unloved, but this? Who would wish this on anyone?

"Richard Moon?" Mary repeated, somewhat louder.

Now Drin was fully alert and looking around the room. Their erstwhile master of ceremonies was nowhere to be seen. Drin's award, if indeed he had won, was so many scraps of paper polluting the stage in front of the curtain and the first row of empty seats. Why? In the name of the Compact, why?

In an example of the theory of random evolutionary drift, the style of technology on all three worlds developed filigrees well beyond the requirements of survival, some being inexplicably weird to members of other races. To make Trimus work, to have common meeting grounds and shared cultural endeavors, we had to go back to basics. Also, what would be the point of having the three species cohabit a world if they were engineered and constrained by their technology to the point where they were no longer the three species? So, Trimus city was designed to be simple and almost ascetic. Use of

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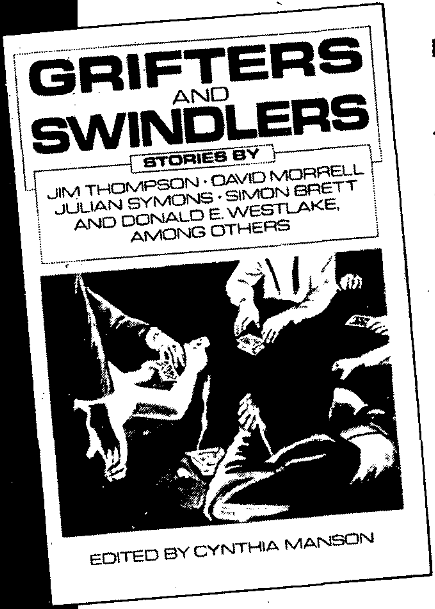
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robotics was strictly limited, transportation within city limits is by foot or wing, and buildings were designed to stand on their own, without requiring active support elements.

—Go Zom's notes on the Compact and Charter of Trimus.

Drinnil'ib's Trimus City office smelled of the sea, as well it should—a deep pool took up the western third of the hexagonal room and connected to the main canal. That, in turn, looped through the city from the North Sea from Miller's Beach to Dori Bay, carefully arranged to let the Zom current, which impinged on the bay, flow through and keep it clean. Clean, neat, ordered.

Not ordered enough, Drin thought. He grabbed a crate of pollution effects samples from the misnamed protected regions of the south and moved it from under the main wall screen to the storage shelves and made a note to turn it over to Do Tor and Go Ton—he would have to delegate more, and the Kleth monitors were more naturally suited to monitor the pollution of these ad hoc human settlements in the protected region. He grunted. Some protection! The protected regions were crawling now with human primitivists and Do'utians playing old-time beachmaster.

Drin noted the mother of pearl century plaque with its silver 144 on the wall—a human decimal word for a Do'utian's milestone rendered in Kleth base eight. It was, in itself, a symbol of the principles of Trimus he held sacred.

The office had been his for over a century, since he'd risen from Monitor to Monitor Lieutenant. He'd stayed there as he was promoted to Monitor Captain, and finally elected to the Trimusian Council and given the Monitor portfolio with the title of Monitor Commander. A human might have requested a larger office, or a Kleth a higher one. But for him, his length of tenancy on this artificial beach was a psychological reward. It would take a bomb to move him.

Unfinished business was stuck in the corners, some of which was probably as old as his occupation of the office. It would have to remain unfinished for a few more weeks, he realized. Pollution! That mess on the awards stage was contaminating everything in his life.

The ceilings were as high as he was long—almost a charter unit, and the arched windows in the southern three walls let in plenty of light during the day. But the surpassingly clever aspect of the office was that the southeast windows faced Ember directly, and its infrared glow fell on photovoltaic panels on the northwest wall, powering the office and the human offices above him. Those were much smaller, though still big enough to allow two Do'utians to visit in reasonable comfort.

Luxuriously spongy soft living carpet covered the entire room—no need for pads here—and it even ramped down into the sea door. Maybe he should go for a swim. Get some exercise. Write his reports with the currents cooling his brain, and download them later. He looked longingly at the sea water.

Someone was coming—he wasn't sure how he knew. Perhaps his subconscious recognized a change in the pattern of ripples in the sea door. But such a small disturbance . . . a child? No, a human woman broached the surface, and gracefully pushed herself up with her forelegs to the normal, for tailless humans, upright sitting posture. She opened her sea mask.

"Mary!" Of course. Doing things the Do'utian way as much as she could, to surprise and please him. Humans typically used the corridors, not the sea doors. But Mary loved being atypical. They'd been acquaintances for almost two centuries and partners for the last two-eights.

"Surprise! I just finished checking out a sub," Mary said as she pulled off her flippers. "Mom says Gori'allolub is concerned about Zo Kim's death."

Drin dipped his beak in respect to the Council President. The fact that the case had the Long One's attention made it all the more urgent. That Mary's mother, Councilor Karen Olsen, was playing an active role in affairs again was also good news—she shared her daughter's inclination toward his species, and, over decades, became too attached to one whose honor had come second to other loyalties. She had been devastated for years by the former long one's belatedly honorable death. Did Mary, at her core, understand the difference between a useful partnership, and human mating, or the Do'utian beach, for that matter?

"Does that make sense?" Mary continued, "Surveillance will turn him up sooner or later."

"A murder," Drin rumbled, anguished, "may have been committed in plain view of eight cubed people, including you and the Councilman Commander of Monitors, and we just lay there like beached gluttons! Yes, the President's interest makes sense! Besides," he waved his tongue at the evidence boxes, "I don't seem to be able to get anything else accomplished with this cow unbirthed!"

Mary giggled. One of the things that made her an easy partner was that she didn't mind Do'utian beach language—there were a few human female monitors, that, once they understood it, felt offended. And the few Do'utian women in the monitor force . . . Drin shuddered and lowered his beak. Many of those already felt he was getting too familiar with Mary—to the point of compromising his position. So he kept quiet around them. And as long as he and Mary were discrete, most people didn't object.

"So I've got the sub ready," she said, back to business. "The connection with Richard Moon seems to be with the Do'utian writer, Gonikli'ibida. Which suggests we head north."

Drin's head came up at the name. She was a relative, and not all that distant.

"She's a mutual friend of both Bi Tan and Richard Moon—to judge by the number of collaborations in the data base, and she was working on a second volume of a collaboration with Bi Tan on the weapons industry of primitivists."

Drin nodded. A significant number of bored humans had fled the north to live "primitive" lives in natural reserve lands and waters in the south. One group had fallen into a dictatorship under a "Lord Thet" who seemed to have empire in mind and was busily trashing all the environmental restrictions and reinventing the wheel of human history. It didn't surprise him that a conservative Do'utian like Gonikli'ibida and a radical Kleth like Bi Tan might find common cause in documenting "Lord Thet's" efforts and their dangers.

An effort to exile Thet and his followers to a freshly bioformed world in the Aurum system had run afoul of outraged biologists and conservatives who had deliberately sabotaged the ecosystem of the new world to make it dangerous for settlement by primitivists. Drin had played a leading and ultimately tragic role in overcoming the conspiracy, but the ecological damage had been done, and any resettlement program was octades in the future. Human Monitor agents were trying, with mixed success, to attrit the colony voluntarily. Meanwhile, Thet was out of control, restrained only by threats of violence that, occasionally, had to be validated.

"Yes," Drin added, "I know they were having a hard time with getting editorial support because of how Zo Kim panned the first volume for being too wishy-washy and boring." With some justification, Drin thought—he'd read the first volume. But the word had to get out somehow.

Mary shook her head. "I have a hard time with Kleth publicly deriding his mate's work."

Drin nodded. A "Kleth Divorce" was common vernacular for any mutually destructive parting of the ways. "Zo Kim found pollution in *everyone's* work. So if it's murder, and Zo Kim's reviews are the motive, we'll have literally a million suspects, given how long Zo Kim has been cutting away at people's artistic efforts."

"Yeah. Well, anyway, I'd rather pursue *that* lead than try to locate Bi Tan."

Drin nodded slowly; the body of Zo Kim's mate had not been recovered—indeed, she might be still alive, working away in isolation, unaware that her mate was dead. If so, the approach to her would have to be sophisticated—and delayed as long as honorably possible.

One didn't run up to a solitary Kleth and spout, "We've been looking all over for you! Uh . . . " Drin had no desire to view a repeat performance of Zo Kim's death. If Bi Tan were still alive, the Kleth would handle it, in privacy, with dignity.

Drin had remembered the death of a fellow monitor whose mate had been killed in the line of duty with Do Tor and Go Ton. They silently offered him a drug to lessen the initial shakes, and left him alone in his office to close the couple's affairs. A few minutes later, he'd invited the group back to say his farewells, and nodded to Do Tor. The Kleth were so intelligent that one sometimes let float loose the fact that they lived twice as close to death as a human or Do'utian, and had attitudes toward sacrifice, pain, and the eating of flesh that were so *different*, that the other two species' instincts sometimes seemed mere variations on the same theme.

Handled properly, Bi Tan, if still alive, could make whatever statements she needed to make painlessly, finish her business, and depart with her dignity intact.

But Gonikli'ibida came first. The outward subservience of an intelligent Do'utian female was a fragile behavioral artifact, founded as much on fear as biology. Given a cause, a Do'utian woman could do anything to achieve her ends; however horrible, anything. It was their saying that the cow defends her children not to her death, but to yours. Gonikli had no children—but she was an author.

"It's an old Do'utian family," Drin said. "Relatives of mine. Their place is on the south coast of Droni Island, near the Innil Glacier. Actually, it's not far from my birthplace. My sister lived with them as part of the Doglaska'ib harem." By a face-saving formal arrangement only, Drin added to himself. Memories. His sister Bodil'ib had died in a fall on the glacier, almost eight-squared years ago, of a broken back and internal injuries before adequate help could reach her. He'd learned about it while in Monitor training. Officially, her life had been incomplete and she had struggled, courageously, against the end.

Her life was less incomplete than most knew. He hadn't been there for her. He'd mated, imprinted, then denied it and left as if he were a human. It had seemed so reasonable, so *Trimusian,* at the time.

"Are you feeling OK, Drin?" Mary asked.

* * *

Trimus orbits tide-locked to the brown dwarf, Ember, that supplies half its insolation. The other half is supplied by the K2 primary, Aurum, about which Ember, its associated satellites, and the Trojan worlds revolve at five and a half Trimus light-minutes' distance. Trimus's atmospheric pressure was engineered to be similar to that of Do'utia and Kleth, about one and a quarter that of Earth. Average surface temperatures range from one and an eighth times the freezing point of water on the inner pole to just over freezing at the outer pole. Trimus has extensive icecaps and continental masses at the east and west poles. Random volcanic isles and impact crater rims spot its oceans.

The north polar area of Trimus is dominated by an ice cap, partly over a number of large, volcanic islands and partly over sea. Volcanoes are more common in the north due to the thinness of crust, a product of tidal distortion as well as the complex orbital resonance involving Clinker (Ember's third major satellite) and distant Aurum that results in Trimus' one-sixth-radian libration. A volcanic island arc circles the ice cap at the top of the inner hemisphere, well north of the Trimus arctic. Following bioforming, a north flowing current formed which moderates the climate along this arc—the seas there are usually free of heavy pack ice.

—Planet Monitor's Handbook,
Planetology supplement.

The Polar Sea was Drin's element.

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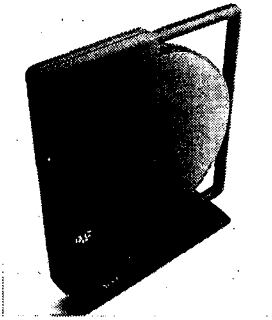

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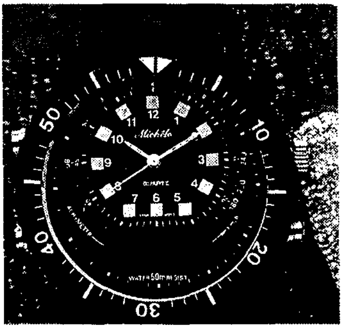

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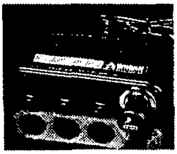

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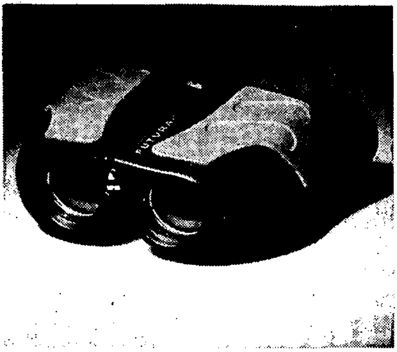

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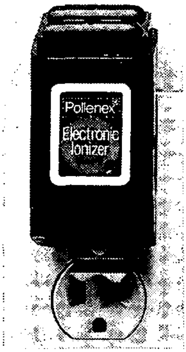

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As the temperature dropped his metabolism increased and he brought his sustained speed up to half a charter unit per beat. Northward, northward. Mary's submarine kept pace beside him. Now and then he would sound deep, turn and fling his tail at the water five or ten times until he had to shut his eyes against the slipstream. Then with one mighty, convulsive twist, he'd broach like a rocket, shooting almost two charter units above the wavetops. From there, he'd scan the horizon for signs of food or distant land. Then he could either knife into the water to pursue a fish normally too fast for him to catch, or slam flat on the surface, scouring the parasites from his hide.

His monitor comset, of course, could tell him exactly where he was—but using that didn't feel like seeing for himself. His was a spacefaring race and hungered for the wide view as well as the deep.

Once, just to show that her submarine could do it too, Mary followed him into the air, using its buoyancy tank exhausts like jets to nose it over smoothly into the water.

On one of these leaps he saw the wind ship; a cloud of sails scudding north.

Once they were under water, he let loose several blasts of sound and watched the sonic image of the water-air interface shimmer as the parts of his brain that actually "saw" interpreted the sonic information gathered by his ears. There was an oval bump about eight cubed charter units east of them. A check with the locator aerostat showed no electronics at that position. A primitivist whaler? This far north?

"Mary, look out for a primitive ship almost due east of us, possible poacher, about point four. No comset, or any electronics."

"Roger, I have it at point-three-seven pi radians from north. Small single hull, just under two charter units. Wide beam. I don't think it's a whaler, Drin."

"Let's hope not." He and Mary both still bore scars from an unlucky harpoon shot from an earlier encounter with a ship from Thet's polar sea colony. Ignored by Trimus's mainly complacent civilization of philosophers, recreationalists, and artists, it had recruited disaffected, hostile, or bored humans until it had become a behavioral problem. Drin and Mary had been given the job of cleaning up one of its nastier messes—humans hunting Do'utians with harpoons. "But we'd better check it out."

"Let me lead, guy. Stay out of range, OK?"

As their relationship had progressed, Drin found Mary, more and more frequently, talking cow-to-calf. It was something they would have to discuss—sometime later. Despite the minor humiliation, her suggestion made sense, particularly since some of these primitivist humans would resist non-human monitors. But he had a suggestion of his own.

Pollution! Make that an order—he was senior.

"Mary, out of range shall be about a charter unit under the ship for me—and relay your voice through your sonar—I can handle the frequency shift. And you stay in the sub! They can see you easily enough through your canopy, and it's solid diamond, which you are not. Also, let's get Do Tor and Go Ton involved now."

A macrobeat later, as Drin and Mary paced the ship below its horizon, the Kleth's contrails traced a white vector toward their destination.

"Weapons not visible," Do Tor sent, with an "oh, yes," echo from his mate. "But two decks likely below what we see."

"You stay in the aircraft, too." Drin sent back. "No heroics."

"Roger, stay in aircraft. Heroics depend on situation."

Any other monitors would be treating him with beak-dragging deference—a danger in this situation. But Mary, Do Tor and Go Ton had been through too much to be awed by his new status; they'd spout before he wandered onto the wrong beach, thank providence!

Two turns of Trimus ago, Drin thought, I was waiting to receive a literary reward. Chaos and pollution!

"Ready when you are," Mary sent.

"Let's go in," Drin ordered, vacated his lungs in a big steamy cloud, then sounded deep and headed toward the ship at an energy spendthrift charter unit a second, his undulating tail and body shoving water efficiently and purposefully behind him. He closed his eyes to protect them from the pressure and relied on the deeper but fuzzier audio image, illuminated as much by the noise of Mary's submarine as by chirps of his own voice far above the range that she could hear. They were below the small ship in minutes. Drin stuck a hand out of his beak and gave her an OK sign, and watched her sub shoot toward the surface.

Mary hit them with her loudspeakers. "Sailing vessel, this is Monitor Lieutenant Mary Pearce. You are unregistered and in an ecologically sensitive area. Be advised that hunting large life forms is prohibited in these waters, and that I have back-up immediately available. Please state your business."

Mary's use of rank surprised Drin. Was this the same woman who, three years ago, had undertaken an interrogation in the tropics by walking up to another human completely naked and saying, essentially, "Hi, I'm Mary?" Well, she swam in colder waters now. As they all would until the council decided what to do with the primitivists—and, somehow, did it.

"Mary Pearce?" the response came. "Should have known that by the way you ran that ship of yours up to me, lee side, smart and pretty. Yohin Bretz a Landend. Harbor pilot, 'till Lord Thet decided his mistress' brother should have the job. Got this as a consolation prize."

Drin released a bubble with his tension. This rustic human sailor had guided them through the harbor on their first eventful visit to Thet's city state, and lived there all his adult life. In spite of his wildly different values concerning technology and sentient relations, Yohin had been a competent professional with a sense of his duty. Drin wondered how many of these wooden ships might get stuck in the polluted mud flats of Thet's choked river delta, now that Yohin was no longer on the job. Thet used his harbor as a sewer.

"Yohin!" Mary cried out with relief. "Tell me you're not poaching, please."

"Not poaching a thing, don't think so anyway. We take enough fish to eat. Small ones—nothin' the size o' your fish-man friend. Say, he your backup today?"

Rustic, but no idiot at all, Drin thought, laughing to himself. Still, he stayed under the boat, hiding his chirps in the random ocean noise while slowly building up a sonar image of the lower decks. Cabins, it seemed. No metal in contact with the hull.

"Now there, Yohin!" Mary laughed. "I'm supposed to ask the questions. No guns on board?"

"Got a rifle. Another consolation prize from Lord Thet—after what you folks did to his guard, he decided to get a little more advanced. Shoots good, too. Don't think it would bother the fish-man though, and I've got other ways of catching fish. Hell, the way Lord Thet's going he'll just be another Trimus City in less than a century."

Drin had heard and seen enough below; it was clearly a passenger vessel. He flicked his tail and rounded the hull, then slammed the ocean aside twice and shot two charter units out of the water. The decks were clear of anything suspicious as well. He dove in and surfaced beside Mary, taking care to minimize the splash.

The humans seemed to appreciate his athletic show—they were pointing and some of them clapping. At the rail of the ship was the lanky, thatch-haired human male he remembered; the man made a motion with his head that might have been surprise, or a greeting.

He pitched his voice low to carry clearly through the sea noise and the walls of the vessel. "Mr. Bretz a Land-end, Councilor Drinnil'ib, Commander of Monitors."

"Well met, Commander. Impressive jump there. Getting used to you folks now."

"How so?"

"Running tourists out of Trimus City since I left Thet. And, Lieutenant Pearce, I am registered—but I left the gadget on the dock. This is wood, wind, and sail here, no compromises."

Mary laughed. "Drin, I don't think they're any threat to us. Yohin, do you still have slaves?"

"Yeah, but they can't be slaves up here, so they're crew. Recruited some more. Look up in the riggin—"

Drin looked, too. A human, heavily clothed, waved down at them. Did he remember the face from their adventure at Thet? Do'utian's didn't forget, he told himself, that was what all the extra brain mass was for. But connecting memories in real time was something else—and he'd gotten a lot of patterns stored in his two gross of Trimus years.

He looked at the side of the ship. It had two eights of ports all along the deck below the top deck, and there was a human face in every port but two—and those were Kleth! The ship

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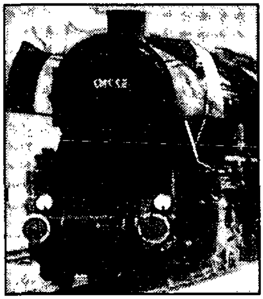

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was loaded with tourists! He even recognized some of the people from the awards event—Gorman Stendt's black beard and the wild red hair of Nelle Yvle, the humorist. How embarrassing!

"Mr. Bretz a Landend," Drin rumbled, "*Next* time, take that one polluting gadget with you. Then we can get to you if you need us, and we won't bother you when you don't."

"Look, fish-man — Commander. That's like being half pregnant. When I say I'm wood, wind and sail only I mean—hey, Mary Pearce what are you doing?"

Mary had emerged from the hatch behind her canopy and was pointing a marker gun at the wooden vessel. Drin barely heard the snap above the sea noise, but he saw the dart planted just above the waterline.

"You're marked now, Yohin," Mary shouted. "I've tagged you with a transponder, and your customers can't arbitrate because it's not your fault."

Yohin scowled and shrugged.

"By the way, where are you headed?" Mary added.

"Hot Springs Island. Landfall tonight, if we don't have any other delays." Yohin replied, ignoring the dart. The volcanic island was about midway from Trimus City to their destination.

Drin's ear comset tone sounded. The Kleth wanted to speak to him.

"Hot Springs Island was last place Bi Tan seen," Do Tor told him. "Writer's colony there."

Interesting. Bi Tan was connected with Richard Moon, Gonikli, Gorman Stendt, Yohin and his primitivist crew. But knowing where a Kleth had been seen two eights of days ago was about as helpful as knowing where a cloud had been. Kleth were naturally prone to flit wherever they pleased, and eight to the eighth years ago they had developed aircraft to do it farther and faster. Bi Tan—or her body—could be anywhere on the planet or in nearby space. Gonikli would be much easier to find.

"Good to see you again, Mr. Bretz a Landend," Drin said. "We'll be on our way now." Drin sounded without further ceremony and resumed his course northward.

He was soon joined by Mary's submarine. "What's bothering you?" she asked.

"Memories," Drin answered. "Of several kinds. From recently, and . . . from my youth. I'd rather put you in their wake until I understand them better myself."

Mary looked at him and put her hand on the inside of her canopy. Drin slowed and sent his tongue to her, grasping a cleat with the hand on the right branch while pressing the hand on the left against the canopy opposite her. He felt her warmth through that. Sometimes, words were not needed.

The culture of Trimus should be looked on as a three-legged stool, not a mystical fusion. The three intelligent species maintain their separate identities under and supporting the overall planetary unity, as codified in the Compact and Charter of the Planet Trimus.

—Go Zom's notes

* * *

"Drin, it's—it's awesome."

The Ib family complex was built on a great beach of black gravel now well above the tide line. They were approaching from the north, and the banded half-disk of Ember, lit gold by distant Aurum, rose huge over the snow-capped volcanic cones behind the great Do'utian domes—as if it was just another, greater dome. Mary rode on Drin's neck, holding on to the thin, but virtually indestructible decorative sash that Drin wore to show his office. On this beach, for politeness' sake, everyone's status should be clear.

Drin nodded. By ancient Do'utian standards, the Ib family estate buildings were respectable, though hardly awe inspiring. But, excepting some of the government buildings at Trimus City, they were among the largest structures on the planet. Drin blew a little steam in an involuntary spasm of humor—he remembered that there was a tacit agreement among the Do'utians that no measurements be taken, lest it lead to beach-status arguments. "Their branch of the Ib have lived here since the founding. The small white stone dome in the center is older than anything still standing in Trimus city."

"Small? It has to be twenty charter units across! Drin, the Ib in your name—is it?"

"My great-grandfather was a second son. If he had been first, and my father had been first in the subsequent line, I would be master of that. But," Drin paused for a short laugh, not entirely free of wistfulness, "there are at least a hundred Do'utians on this planet with a closer claim. The flaking domes are fairly recent; they replaced older domes that fell in a quake eight-cubed, three eight-squared, seven-eights and two years ago. The more modern hexagonal structures house employees and a small replicator factory."

"How many live here?"

Drin had to think. "Doglaska'ib is the long one, and has been for nearly seven centuries. He has a harem of five including Gonikli'ibida, though this is attended more by his son and heir, the master Borragil'ib. Two bachelor brothers maintained offices there, but they live in Trimus City for the most part. There is a child in residence and Borragil'ib's widowed sister. Uh—" it was uncomfortable for Drin to admit the next—"a cousin, a returned primitivist, and two of his beach harem are staying there too, temporarily. So there may be a dozen in residence, but our ways are such that two or three are all we're likely to find here. This complex will house three-eights comfortably, and there have been larger gatherings. Their cybernetic system maintains the place between visits."

"They have an artificial intelligence in this place?" Mary sounded horrified, Drin thought, at what she clearly thought was a violation of values and possibly the Compact.

"We aren't in Trimus City anymore, Mary. The domination of one mind by another is not abhorrent in Do'utian culture, and this is perhaps the most Do'utian place of Trimus. The computer is a tool, technically subsentient."

"First Yohin, then this. I'm getting

a lesson in the gray areas of slavery law today," Mary remarked. "An uncomfortable lesson."

"A stool without legs," Drin remarked, referring to Go Zom's famous metaphor, "would be uninteresting."

"You guys don't use stools," Mary countered, and laughed to take the edge off.

It was, Drin realized, a purely Trimusian thought. If the Ib beach hold represented the foot of the stool, then he and Mary were where the legs joined the stool.

For all its timeless magnificence, the complex wallowed in technology to a breathtaking extent—a Do'utian settler from eight macroyears ago would not have felt out of place. They passed through a magnetic suspension barrier on their way in and Drin shivered as the field-stabilized liquid barrier scraped anything loose on his body from him as he pushed through it into the delicately perfumed water of the complex. He had to pull Mary's submarine through the barrier; it propelled itself by pushing water with electromagnetic fields, and the barrier interfered with that process.

The ramp from the sea door was covered by a transport carpet composed of microcilia that pushed him up and into the entrance chamber without his having to move a muscle. Mary's eyes went wide when she found that the water of the sea door had seemed to solidify to let her walk from the submarine to the solid surface with wavelets lapping on either side of her. A smart nanite jell, Drin assumed.

Drin had grown up with all of this, but it hit him with waves of nostalgia whenever he returned from the open sea, or even the comparatively ascetic environment of Trimus City.

No one had come to greet them, but this was not unusual in Do'utian society.

"Smooth currents to Dag Doglaska'ib," Drin greeted his uncle and host, knowing the system would relay the greeting. "We've come to talk to Gonikli'ibida; Monitor duty, I'm afraid. There's been a questionable death."

"Smooth currents, Commander Drinnil'ib," a disembodied Do'utian voice said, as if the speaker were standing near Drin. "Ibgorni speaking for the house. Doglaska'ib receives your message, and bids welcome."

It was as if the long one himself were speaking, Drin felt. Ibgorni's mind had grown in Drin's absence—perhaps more so than even he could take comfortably.

"Gonikli'ibida is in residence," it continued, "but outside now. We offer you the yellow sector in the south dome. Does the Lieutenant wish to stay with you or have her own quarters?"

Mary looked at Drin, and he had a quick decision. Which would cause more gossip? To send Mary away halfway across the huge complex when everyone knew that they lived together in the field would look like he was being overly sensitive. Drin opened his beak just enough for Mary to see him give the OK sign.

"The Lieutenant," Mary spoke, "will stay with Commander Drinnil'ib, facilities permitting."

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"The appropriate facilities will be in place by the time you reach the sector, Lieutenant. Commander, Borragil'ib has been informed of your presence and wishes smooth currents. He also intends to feed at midnight and asks if you would join him."

"Tell him the honor will be mine." Drin dipped his beak slightly as he said this.

"Borragil'ib?" Mary asked.

"The first son. Dag Doglaska'ib is very ancient, and while physically sound his mind explores uncharted seas these days, in intense concentration. Borragil'ib is of my generation, and is still intrigued by the organization of things." Drin headed for the corridor to the south dome, its opening artfully disguised by holo dust. Halfway through he realized Mary wasn't with him.

He turned and stuck his head back through the insubstantial but opaque curtain. "Shall we?"

"Uh, Drin, this is just going to take some getting used to."

What was troubling her? Holo dust was just standard Do'utian interior decoration, Drin thought, the technology was twice as old as Trimus, at least. Then he realized—

"I'm sorry, Mary. I forgot you don't see at audio frequencies. Don't worry. It's just well-managed dust." It must have looked to her as if he were sticking himself through solid rock.

This time she shook her head, gave him a nervous little giggle. "You guys are so huge, so elemental, so natural; and things are so basic at Trimus City, we forget to think of you as having such a technological heritage. It doesn't fit the image somehow."

"Image? Mary, there are branches of us, as there are of you, that are minds with no use for organic bodies, or even individuality." Drin shuddered, slapping his tail against the side of the hall. "They are out there, and I think they watch us now and then—like we watch the lungfish."

"I think I can handle the holo dust," Mary said, "it just surprised me a little." She followed the rest of him through the curtain. "Lungfish?" she added, shaking her head.

Borragil'ib spotted a Stingsnake, grabbed its neck with one branch hand in a lightning whip of his tongue, stuffed the long, thick body into his mouth, and pulled his hands in after, until only the flailing head of the poisonous beast projected outside his beak. Then he severed it with a judicious nip.

Drin had to admire his cousin's technique. The Stingsnake was the largest Do'utian sea predator brought to Trimus, and its bite on the tongue could fester. A human would get a painful puncture, but the air breathing vertebrate's venom had no effect on them. Did we make our oceans too safe? Drin wondered. Perhaps we need a little something to fear out here—besides each other.

Smooth, slim and sleek Borragil'ib seemed to fear him, or rather feared the questions he came to ask. His cousin swam with a classic grace, nowhere near matching Drin in strength, but still seemed to slip through the water as fast on half the effort.

They talked to each other in the old sonic language, symbols related to each other in two dimensions rather than just by linear grammar. When Mary had asked about this, Drin had reminded her of English sentence diagrams. She had nodded. "Very well," he'd said, "substitute symbols for the phrases, nouns, and verbs. Then add a few more lines. It's complicated and not necessarily any faster, but it handles a lot of subtleties. It's especially good for mathematics."

What Borragil'ib's images told him was that Gonikli'ibida did not want to talk to Drin, and the family did not want Drin to press the issue.

The family? Drin imaged the long one.

Borragil'ib imaged a black sphere, a symbol for the unknowable, and a warning not to press that issue.

Gonikli's research into primitive weapons?

The symbol of challenge was associated with Drin's inquiry and Gonikli'ibida's reluctance, and this tied to a response-to-challenge symbol.

A description of Do'utian psychology, Drin wondered, or a threat?

Kleth and Human were difficult to describe in these chirps and whistles, but there were conventions. Drin shot his tongue at a passing fish, grabbed it, and stuffed it down his throat. Then he composed the symbol for human (the symbol for a monkey-like Do'utian vertebrate plus the symbol for thought) and modified it by talking-of-other's-deeds-of-words, and related it to the dead Kleth (a now non-thinking thinking flying creature). Drin related those to the dead Kleth's maybe dead mate, and tied the human and the dead Kleth to Gonikli'ibida with friendship bond symbols. Finally, a question symbol was tied to the human's position symbol.

Quickly an image returned negating Gonikli'ibida's connection with the death.

Drin sent one negating that image, and another asking simply, "Where is Richard Moon?"

Borragil'ib broached for a breath, dove deep, and returned with the smell of a house-snail trailing him. He showed Drin a picture negating Gonikli'ibida's knowledge of the human's position, and associating Drin's questions with challenge again.

Drin questioned the need to defend Gonikli'ibida from questions.

Borragil'ib raised the image of honor challenge.

"No," Drin replied in the definite, linear logic of English, "I do not challenge your honor."

"You swim in Do'utian seas now, Commander. Seek your information elsewhere."

"Your protests have now convinced me that Gonikli'ibida is somehow more connected with this than simply being a way to find Richard Moon. I am bound by duty to learn what that connection is."

"There is none! She is an artist and wants to be alone to think. She does not know where Moon is. Leave it at *that.*"

"Very well," Drin said, smelling challenge. People as thoroughly civilized as the Ib would not be involved in beachmaster duels. But they had political influence that, if anything, could be more deadly. It was time, Drin thought, even at his level, for him to dip his beak. Perhaps Mary or the staff back at Trimus City would have some ideas.

Death is a common denominator of Trimus; our philosophy was to not extend individual consciousness indefinitely by cybernetic means. Some still might go elsewhere for this, and so cease to be Trimusians. But death here does not come from physical aging—Do'utians do not die of old age, and the human and Kleth had engineered that from their genes long before their first contact—but from accidents, or from choice. Humans and Kleth enjoy risk, and so had a median life span of just over three centuries (503 turns for Kleth, 472 for humans), at the time of founding. Do'utians who don't have accidents at sea simply get longer and stranger, usually refusing to communicate or eat after seven or eight centuries. We revere the cycle of life, but, as intelligent tool-makers, we do so on our own terms.

—Karen Olsen, "A History of Trimus"

The facilities that Ibgorni had contrived for Mary at the spur of the moment included a pool of warm water, tiny by Do'utian standards, but a convenience they easily understood. It was not quite as long as Drin, but in it, Mary could swim several body lengths, sound, and even spout after a fashion; the warm moist air from her lungs quickly turned to steam in a room temperature meant for Do'utian comfort. She was swimming vigorously when he arrived back at their room, perhaps a little bit overfull from a night of hunting and feeding that had, he thought, gone a way to quiet Borragil'ib's itchy-tailed hostility.

In the hot pool, Mary had no need of the artificial skin she normally wore to protect and insulate her, and Drin examined her anatomy with his usual discrete fascination. Mary, several times, had told him that it did not bother her in the slightest to be examined in this manner, and that, truthfully, she liked the attention, and if he were curious about what she felt like that would be fine as well.

Drin's curiosity did not reach that threshold of intimacy yet.

Raising his tail for leverage, Drin reared up, put his foreclaws on the sill of room's long window and looked out at the stars. The window faced away from Ember, which was cut in half by the horizon at this latitude and further dimmed by Trimus's thick atmosphere.

Do was visible, a fourth magnitude star in the middle of an asterism that Do'utians called Gi'ab. The constellations toward one's home world looked the same, if a little smaller, Drin thought; the strangeness lay beyond. There was a splash, and a hot body attached itself to his lower right leg.

He sent his tongue down and lifted her up to his shoulder, where she was able to find a foothold.

"You must be very cold."

"I can handle it for a while. It's beautiful out there. Gonna take me a starship trip one of these years, if I

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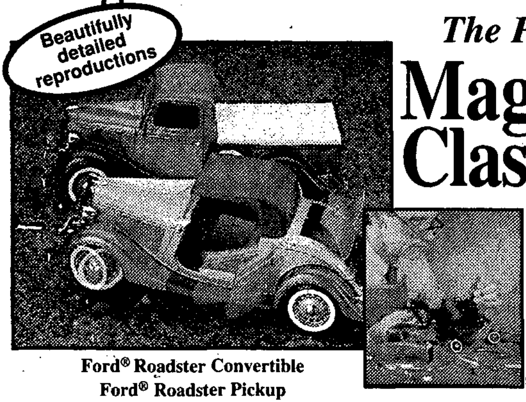

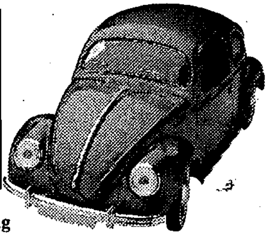

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don't get myself killed first."

"Earth?"

"Yeah, and Tau Ceti. My great great-grandfather came from a region of Earth called the United States, and his great-grandfather came from a town in England named York. His name was Samuel Pearce, and we're told his great great great-grandmother was raped by a Viking—a kind of human barbarian—in a war with Norway some six centuries before that." Mary laughed. "Except, if she were like me, it might not have been rape. That's as far as I can go back. You can't see Sol from here, but I think Tau Ceti—it's near the bright star by the south galactic pole."

"Godro," Drin named the south galactic pole maker, "in Do'utian, Beta Ceti in English."

"Actually," Mary chuckled, "that's Greek and Latin, and to further confuse you, the star is also called Diphda, in Arabic."

Drin grunted. "It's Bogdo'ilda in Brogilla'a, the nation of our southern continent that started space travel." So a chance star gave reason to contemplate the vastness, both of the cosmos and of history. "We both carry the memory of our ancestors toward eternity, to give their lives meaning."

Drin felt Mary shake. "A fearsome responsibility," he added.

"I'm not afraid of that, Drin. But I think I'm about to admit I'm freezing. Help me down?"

He set her down, and she immediately sprinted for the hot pool and knifed in cleanly.

After a few minutes she got out and looked around. "Any towels?"

As if in answer, she was bathed in deep infrared from projectors so cleverly concealed that Drin hadn't realized they were there. "Hey! OK, I'm dry!"

Drin slipped back down to the floor and considered Mary with his right eye, and thought about the various modes of bonding in his own species. The territorial jealousy of a beachmaster was legendary, but, away from the beach, such Do'utian men went about collective affairs with a formal dignity that often verged on admiration of each other. Unmated Do'utians who avoided the beach were the backbone of his species' science and industry. In civilized times, formerly mated or mated females who avoided calving tended to dominate arts and politics—displacing their creative and nurturing drives, the theory went. They worked well with unmated males, and often rose to the second levels of leadership. The first levels were almost always mated males, however.

Where, Drin wondered, did Mary fit? Where did she want to fit?

The room shook, seemingly with the thought, and warm water sloshed from the pool. Mary looked up to the curved ceiling far above, suddenly tense and aroused. Subtle bulges in her body reminded Drin of how much of her tiny body was bone and muscle—incorporating any Earth land life into the Trimusian ecology had been fraught with problems due to the genetic heritage of evolution in high gravity. Here, Earth life ran with blinding speed, took incredible leaps, and, people said, could drag away burdens of many times their body weight.

Drin tried to imagine Mary dragging him away and allowed himself a low, rumbling chuckle, glad to be distracted from less easy currents of thought.

"Don't worry about the temblor," he said. "This is quake and volcano country, and we build for it. What they told me as a child was that you could take this whole complex and drop it a charter unit, the whole length of my body, without breaking it."

Mary shook herself, some last drops of water flying from her hair and laughed nervously, "Glad to hear it. Drin, you seem to be thinking deep thoughts. About me?" She walked up to him and placed a hand on his beak.

Exchange of affection by bumping and touching was common to both species. In Do'utians, it was between anyone, but in particular women in the same harem, or on the same project—the feelings of security and trust created by mutual touching were particularly strong. In humans, Drin was fully aware, it led, in private situations, to a performance of their mating act, which in civilized times served to create greater-than-ordinary emotional bonds between the people that did it. They apparently enjoyed it.

Did Mary expect him to pleasure her? Humans mixed affection and reproduction. But the Do'utian mating act was utterly different in feeling and purpose. It was a two-step process and not at all fun. Quickening the ovaries was something a beachmaster did instinctively to maintain his harem —it released hormones in the cows that helped make them subservient.

The beachmaster's reward was subservience, beak dipping, and staying. The act itself was very mechanical, not pleasurable, though for some, the feeling of power was. Later, taking and fertilizing the eggs was a compulsive, messy, and humiliating procedure that had to be done or the bearing female could die. The female was grateful, the male would typically feel the need to go on a long feeding swim. In primitive times, he would return to dominate, protect and feed his harem. Civilized Do'utians discovered in vitro fertilization a long time ago.

Drin needed to make some response to Mary—not doing so would be impolite. He opened his beak and laid the hand of the right branch of his tongue on her shoulder. Drin was quite happy to touch Mary and display his regard and affection for her. But he did not want to turn her into a subservient cow—that could be dangerous in a crisis.

Of course, she was human and that wouldn't happen. But how would he feel when it didn't? The idea didn't work for him that way, not at all. But why was he so fascinated by the idea? Intellectual curiosity? Did he want to seem human to her, the way she seemed to try to be Do'utian with all the time she spent in the water? He found her unnaturally warm, smooth, dry flesh strange, fascinating. Would he ever be able to talk freely of these things with her? What instincts of hers were coming into play, and what curiosities?

She seemed cheerfully aware of the

esthetics of her body. Mary smiled at him. "Drin, if I can feel beauty in a horse, in a swordfish, in a cat, or in you, then you feel beauty in me! I don't have to look like a Do'utian. Don't question it so much; enjoy it!"

Drin moved his hand down her arm, acknowledging. She covered her hand with his and guided it. This was between them, and harmed no one. Except that it took time.

"We need to go to work, Lieutenant," he said.

Mary took a deep breath, and exhaled. "Right." She touched her lips to his hand, dropped it and scampered to the pool side. Quickly, she got into the olive body suit she wore to work in the salt sea and on the frigid polar land.

Drin gratefully turned his mind to the problems at hand. "Mary, Gonikli'-ibida apparently doesn't want to be questioned. I was warned off, very strongly."

Mary nodded. "While you were out, I did some information gathering. More gray area stuff, but I'm taking your position that the house computer is not a sentient being and the question of testifying against itself or breaking its confidences does not arise."

Drin chuckled. "The only time the currents say anything about how someone passed from here to there is when they carry a body."

"Huh?"

"Ibgornia *let* you have the data."

"Oh. Well, Drin, there *are* currents of ice not far from here, and they carry a body. Could Gonikli'ibida's reluctance be personal? Something between you and her?"

Mary was a good investigator, and for once, Drin thought, a little too good. This current led over a waterfall. "Possibly. We were close, once."

"Drin. . . ."

Drin sighed from his blow hole, almost like deflating. So she knew. But what did that have to do with anything? "We left my sister, Bodil'ib, where she died. Eons hence, she will reach the sea."

"How did she die?"

"The memory is painful. Is it relevant?"

"Would a Do'utian keep coming back? To pay respects? Or in times of great emotional stress? Have you?"

"Privately. She is gone, but she is still there—the suffering is frozen in her body. Mary, she went out alone in a snowstorm the day I left for Monitor training, and fell into a crevasse. They found her days later. Do'utians are built for the cold and it takes us a long time to die of it. They got some nourishment down to her and she seemed to rally for a while—she recognized Gonikli. But it took too long to get the equipment there."

"I'm sorry Drin. But there's more, isn't there?"

Oh, yes, there was more. How much did he dare reveal to Mary? He remembered the strange, intense warmth of her body, and how that had said, "trust me, trust me." She had saved his life more than once. Their ancestors had evolved in wildly different environments—but a common physics and logic of sentience had done its work, or they would not be here together.

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"We are in conservative circles here; can you be very careful of who you tell?"

Mary nodded. "Drin, was there a bond between your sister and Gonikli'ibida that could last after death? Could Gonikli'ibida be out there, at the glacier now, looking for some way to deal with something? With you?"

"We were immature, Mary, playing games. New to our bodies, and curious. They wanted me to play beachmaster and they would play my cows. We didn't understand what would happen, inside, as we played these roles. It just isn't done with one's sister, but we didn't mean to do it. We didn't know what 'it' was; our stuffy parents kept too much in their beaks. We weren't mature enough—there weren't any eggs—but Bodil became very dependent on me. Then I left. Gonikli didn't bond as strongly with me, but she felt Bodil was her senior co-mate; that bonding can be almost as strong."

"Her first love. Drin, I can understand that. If she's as disturbed about your questions as you say, maybe she went back to where—did you say Bodil? That's a human name, too."

Drin nodded, teetering on the brink of understanding. "Bodil'ib. My sister."

Mary continued. "Maybe Gonikli'ibida went back to where Bodil died."

Drin nodded. Gonikli might go there in time of crisis. But. . . .

"But why would this be a crisis for her? We are only trying to find Richard Moon."

"She was close to both Bi Tan and Richard Moon. Richard Moon didn't say he saw Bi Tan die, he said someone he trusted had told him."

Now that Mary had pushed him into the sea of understanding, what lay on the bottom was obvious. "You think Gonikli was the one who told Richard Moon that Bi Tan was dead? That would be unpleasant, but less than a crisis, unless she wasn't being truthful. But a lie like that would kill both the Kleth, including her friend. None the less, it looks like she was involved—but how?"

"We'll have to ask her, Drin."

"Against Borragil'ib's will?" Drin remembered images: images of challenge and images of duty. "Very well. We should go now. He has been away from the complex and may have other duties."

Drin looked around and thought of family versus duty, and the possibility that he would not be welcome here again.

Trimus's climate is similar to that of Do'utia. That is to say, a little more energetic than that of Earth. The differences are, of course, statistical, and the immigrants from temperate Earth zones who settled in the high latitudes of Trimus claimed, ruefully, that they felt at home with the tornadoes. Do'utian immigrants noted that while the storms on Trimus are of similar intensity, they last much longer. Simulation studies point to the steady input of Ember and the complex tri axial climatic map to explain the duration of polar storms. Over the years, the main belt of Do'utian settlement has moved somewhat south of original projections.

—Go Zom's notes on the
Compact and Charter of Trimus

The wind made even Drin cold, and he found himself picking up his pace through the early morning gloom to generate more heat. He could smell his skin glands react to the cold; his outermost doci or so would, effectively, hibernate, but remain flexible. Mary had substituted big, wide-bottomed boots for her flippers, but otherwise wore her formfitting artificial skin with an extra power pack. Her sea mask doubled as a cold mask and she'd added a transparent, wind-impervious, hooded cape with a weighted hem. Her tiny form bent against a wind that seemed to Drin to be enough to blow her away like a Kleth.

They reached the glacier after a vigorous climb of almost an hour that left Drin at an almost comfortable temperature. It lay in a valley between two mountain ranges piled high by the spread of a polar rift to the north, and spilled into the sea-flooded caldera now occupied by Drin's branch of the Ib, west of the dome complex. On its way to the sea, the glacier split into several huge crevasses. When it got there, it gave rise to many icebergs.

For Drin, the glacier aroused primordial feelings, terror of the heights, comfort in the smooth ice and horror in the knowledge that below the surface of this ice lay not food, but death.

Drin had not called Do Tor and Go Ton in on this yet, thinking that he and Mary had overreacted a bit around Yohin Bretz a Landend's tourist sailing ship—to the point of embarrassment. And, he'd reminded himself, they were not now going toward a potentially armed and dangerous vessel, but a heartsick Do'utian woman who had seen one too many close friends die.

If they could find her and get her to tell her story, whatever it was, Drin was hopeful that he could smooth currents with Borragil'ib and be on his way.

The glacier had flowed several macrounits toward the bay since his sister's death, the surface features remained very much the same—it was almost eight-squared charter units across with a hump on the west wall about two-thirds of the way toward the sea. East wall lower than the west. It was split by several large crevasses, from flowing faster in the center than at the sides. In one of these, through occasionally blinding flurries of fist-sized snowflakes, Drin found his sister.

Someone had been visiting Bodil—her body was encased in clear ice that had been kept clean of all but the most recent snow. Memories. It had been storming like this when they found her. She had broken her back in the fall, but that would have been repairable if they could only have gotten her out in time. He shook as he thought about it.

Drin had to stop there. The visitors must have taken a different route; the sides of the crevasse came too near the walls of the valley here for Drin to find an easy way. Mary went ahead.

"Mary," Drin said at length. "There's no sign of Gonikli, so we may as well go back."

There was no answer.

"Mary?" Drin called and looked around. She had been standing at the lip of the crevasse near an avalanche site that looked like a possible way down not a minute ago. Drin looked around again. Her olive body suit should stand out fairly well against the white snow. Still no answer.

Fearing the worst from the wind, he eased himself closer to the edge of the huge crevasse and looked down at the wall. Ominously, it seemed to overhang a little. Far below, perhaps six times his body length, he saw a splotch of olive color. How could this happen? He wondered. Had she been so surprised that she had not even cried out? Had he been so preoccupied that he hadn't heard? Had he felt a little shake? A quake? No, that had been his own feelings, hadn't it?

This couldn't be happening. Mary and Bodil in the same crevasse! Drin roared in anguish, then remembered his comset. There had to be some aircraft that could fight this storm. Best turn things over to Do Tor; Drin felt he was in no emotional shape to be much help in anything.

He stuck his head over the edge again. There had to be a way down. He looked at the green splotch with both eyes—it did seem to be Mary and she wasn't moving. Now he realized how much a part of his life she had become. Familiar, expected, a certainty. Like his gun, like the Compact, like the Ib homestead, like—he remembered—his sister.

"No, no, no!" he roared at the unfeeling wind.

She had fallen about eight charter units from him, having followed a ledge that looked too narrow for a Do'utian. But he had four strong claws and the walls were snow and ice, not stone.

Drin reared up with his head pressed against the valley wall and placed a rear claw on the ledge, testing it with his weight. It held.

The snow on the wall had been densified by freeze-thaw cycles and compressed almost to ice by the wind. He slammed a foreclaw into the packed snow, claws extended, and pulled. It seemed solid enough. He risked moving his right rear leg, stretching about an eighth of a charter unit along the ledge until he found comfortable purchase. Then he swung his tail over to the ledge; it had nothing to grip with, but could exert a little upward pressure for balance. So, hanging by his foreclaws and the one rear leg, he moved his left rear leg to where his right one had been.

So far, so good. He made another foreclaw-hold and repeated the process. He was burning energy at a tremendous rate, but felt exhilarated—he could work at near maximum efficiency with the cold polar wind taking heat away as fast as he generated it.

Thus, with his massive bulk clinging to the wall like some kind of lizard, he managed to work his way sideways toward Mary.

Halfway to where she fell he set a foreclaw only to have a great swath of snow and rock pull free and go tumbling down over the edge, leaving his right foreclaw pawing nothing as

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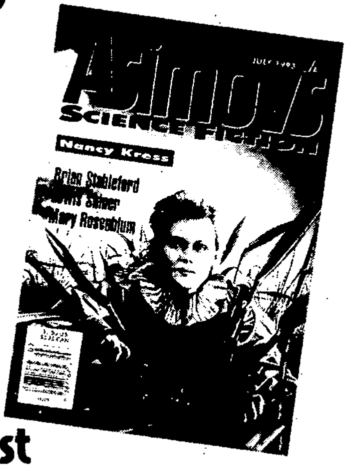
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he struggled with his other three limbs to stay on the wall. The snow under his left claw started to groan, shifting slightly. He began to lose his balance, tilting outward. Instinctively he shot his tongue uphill, found a rock and clung with both hands.

The wind stung his extended tongue. It would freeze in a few beats if he didn't do something. He brought his right leg back toward his body and stabbed his claws into the snow just beside his head, and pulled.

If the snow here fell away too, he was done. But it held. He let go of the rock and pulled his tongue in. It burned the inside of his mouth with cold—but he could still feel. He tasted old ice, bitter with volcanic ash and dust. No permanent damage, he hoped. But he would have to go back.

No. Mary was down there.

Where was that polluting aircraft?

The wind blew some snow from the slide—it was loose, obviously. Experimentally, he shoved at the pile on the ledge with his tail. An eighth-squared of a cube of the stuff fell free over the ledge. Using his tail, he brushed the fallen snow from the ledge, and discovered the small avalanche had actually given him more room for his rear feet.

It took him a macrobeat to work his way through the small avalanche, but he managed it.

Ten macrobeats later, he was nearly over Mary. He tried his comset.

Nothing.

He pulled a in big lungful of freezing air, slowly so it wouldn't freeze his blow hole, then yelled her name, throwing a recklessly large amount of volume into the lower register. Anything that was going to go in this area, he figured, had already gone.

An impact caught him in mid-bellow, not from above, but on his lower left leg, dislodging it from its precarious clawhold. A small shadow figure appeared momentarily then vanished into the blowing snow. What?

His attention had been on Mary and his upper claws were relaxed, and set in recently loosened snow anyway. Without the left rear leg, he started sliding down. Almost immediately, his rear legs were over the edge of the crevasse, flailing at air.

He dug at the snow with great swipes of his foreclaws now, essentially trying to swim back up the snow slide. For a moment it seemed to work.

Then there was a terrible moaning groan and the entire mass of snow under him seemed to flow, sending him into weightlessness over the edge of the giant crevasse. In one last act of sanity, he triggered his emergency beacon.

Then he screamed the death scream, instinctively warning any of his kind within hearing of mortal danger. Lungs still full, he glanced off the ice wall and bounced like a rubber ball, then exhaled in a great, painful gasp.

He hit it again and instinctively clawed the wall. The ice tore at the webbing between his toes, but he slowed, and slowed. He'd almost stopped when his left foreleg caught a crack, far too suddenly. He felt a bone snap, and let go in immediate reaction to the pain. But he was almost down to the floor, the slope was much less steep, and he stumbled more than fell.

He bounced once more and belly-flopped on the snow that over the ages had filled in the bottom of the huge crack. Pollution! How could he hurt so much? The nerves of his leg screamed in pain as he fought for objectivity.

Pulling air into his lung helped calm him. Somehow, aside from the leg, he was reasonably intact. The strained muscles in his back would feel abused for several turns, but he'd been through worse.

Drin gazed up at the edge of the crevasse through gaps in the blanket of blowing snow. If there was a way down, there was a way up. Walking three-legged was just barely possible for a Do'utian. Better to rear up, he decided, and stagger on the two hind legs, human fashion. But first, find Mary.

Every bruise and strain protested as he stiffened his tail for leverage and started to rise.

A roar like an aircraft fan buzz began echoing in the crevasse, building louder and louder. Wrong somehow—but the ice walls and the howling wind distorted everything. An aircraft? In this storm? Do Tor and Go Ton finally? It seemed so. Thank providence!

Then the first chunk of ice hit him. He had time to look up and see a giant vertical column of it slowly detach itself from the wall of the crevasse and topple over right on top of him, a huge solid slab heading right for his head. He tried to move and fell, collapsing on his broken leg, his beak digging into the ice. Then an ice slab landed on his head and he lost consciousness.

In inventing Trimus English, we gave the prefix "macro" the specific meaning of eight to the third power, and the prefix "mini" the specific meaning of eight to the minus third power. These were in addition to and consistent with their ordinary usage implying the very big and the very little. They, with prefixes like di, tri, etc. for squaring, cubing, and higher powers, were also direct literal translations of the base eight terms from my native language, for which I make no apologies. Math was never my specialty, and I was grateful not to have to relearn it!

—Go Zom's notes on the
Charter and Compact of Trimus.

When Drin put his memories back together he was surprised to find that he was still around to remember anything. It was pitch dark. He was colder then he'd ever been in his life. He couldn't feel the end of his tail. His left foreleg was a tearing, rending, agony with each breath he tried to take.

"Mary?" he groaned, in reflex. There was no hope. There was no answer.

The situation was insulting. He was of a race that had moved worlds, that had made machines that answered their every whim, that had banished age and war. What was he doing helpless under a pile of snow? He tried to roar in anger. It came out as a kind of grunt.

Pollution, he wasn't dead yet. The first thing he had to do was to get into his ventral pouch. He had some of the tools of civilization. His comset. A gun that could possibly blast a small hole through this covering if he had enough explosive rounds.

He wasn't sealed in—he could breathe. He couldn't see it, but thought there must be an air pocket above his blow hole. He tried sucking air in, then exhaled with his valvae marinae closed. This expanded his upper chest at the expense of the abdomen, and, with an awful creaking protest that filled the sonic spectrum with white noise, the block moved slightly up, and to the side. When he exhaled again, he could wiggle a little. Some water dripped into his blow hole; his breath must have melted it. This slight evidence of affecting his environment helped his morale greatly.

Cold at least was numbing his broken foreleg. After another macrobeat of huffing and puffing, Drin found he could half-wiggle and half-roll enough to slip his tongue out and reach his pouch. His outer skin was so numb and leathery that it didn't feel like part of him anymore. That would be something for the doctors, he feared. In the meantime, he had his gun and his comset.

Now, where was all this snow and ice most thin? He closed his eyes to concentrate on the sonic image and tried various frequencies of voice, looking for the one that made the picture deepest and clearest. His prison seemed darkest off to his right; which meant the fewest reflections, which meant, he hoped, the thinnest.

Drin squirmed and wriggled until he could open his beak a couple of docis wide. Then he held the gun about a doci from the ice, and fired.

Ice chips stung the inside of his mouth. He probed the hole with a finger—it was deeper than he could reach. He fired twice more into the same hole, and no ice chips came back from the last shot. Struggling to reposition his beak, he repeated the procedure five more times until he had a rough hexagon of holes to the outside near the corner of his mouth.

The idea was that his hexagon of gun-drilled holes would define the weakened border of a plug that he could push out with his good right foreleg, if he could get it in position. To do that, he had to burrow forward, just a little.

The struggles had gained him a little more freedom of movement. He bit off a little ice, pressed his beak to the side, and bit some more. In about a Trimus hour, he was able to wiggle the upper part of his body sideways an eighth of a charter unit. Then he had to press himself, in excruciating pain, against his broken leg to create enough room to bring his right foreleg forward. He groaned in relief when he finally got his claw in the center of the hexagon of holes.

Drin rested. Then he pushed with every cuf of strength he could muster, holding his breath to stiffen his body as much as possible.

The ice broke and Drin found he'd punched a large hole in his prison. Not big enough for him to wiggle

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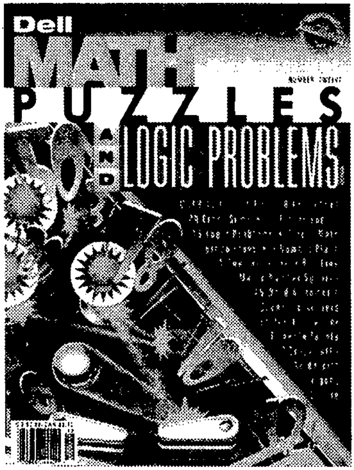

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through, but perhaps he could enlarge it. He started tearing great hunks from its perimeter with his right claw.

"Drin?"

The faint, but clear voice froze him.

"Drin?"

"Mary?"

Drin struggled to get his right eye at the hole. Mary was standing, shaking almost violently, in the snow and wind just outside the hole. Her cape was gone, as was her mask. Her face was blotchy.

"Damn, it's good to hear your voice," she said. "Is it warm in there? My power's used up."

"The freezing point of water is about the best I can do—and there's no room. I was buried thoroughly. What happened?"

"Got shot with a trank dart when I wasn't looking, and fell. Dumb. That avalanche was no accident—it was set off with some kind of weapon. Well, we were looking for a possible murder suspect. Guess w-we found one."

"Mary, I got pushed off myself. It might have been a human—maybe a primitivist working with someone here." Gonikli? An artist friend of hers? Borragil'ib? Could his cousin be yet another proud Do'utian who had found a cause greater than honor? "Time to worry about that later. I have a field med kit in my pouch, with maybe an emergency wrap in it."

"Gonna need more than that, Drin. I have to—get—warm."

There was only one way to get her warm that he could think of, but it would incapacitate him further. So, he had to do some other things first. He grabbed his comset, set it on emergency relay, and stuck it out the hole he'd dug.

"Set this on a rock or something, flat side facing south," he told her, "Then come in here. I'll try to open my beak wide enough so you can crawl in my mouth. Feet first if you can. Uh, Mary?"

"Drin?"

"If I die, stay inside. My body will keep you warm for many hours." He said nothing of the hours of agony that it would take the cold to shut off the blood flow to his brain at the center of a shell of dead frozen flesh. He would have to endure that, for Mary's sake. The longer he could stay alive, the longer she would.

"R-right." Her hands shook terribly, but she took the comset and managed to wedge the unit in a crack of ice facing south. Then she started backing in through his hole. In the meantime, Drin found his medical kit and got it out of his pouch and into his mouth. That done, he grabbed Mary's boots, opened his beak as wide as he could, and pulled her in. With her feet freezing his throat and her backpack poking the lining of the top of his mouth, he closed her in. She just lay there and shivered.

She wasn't sealed in; he had to leave room for his tongue to hang out the left corner of his mouth—it was starting to freeze again!—and that left an air gap. He breathed for two, inhaling through his blow hole and exhaling the warmed air through his mouth over Mary, his tongue and his hands.

With Mary as secure as she could be, and to keep his hands warm, Drin

resumed work on the hole. Another four holes outlined the vertices of another hexagon, contiguous to the first. Rather than pushing it out, and letting the wind in, he outlined a third. Then a fourth.

Despite the noise of the gun drilling through the ice, Mary seemed to have gone to sleep.

At least he hoped it was sleep. He could tell she was still alive, but not much more, and unconscious. To wake her, he knew would deprive her of badly needed recuperation time.

But not knowing was a torture.

The work was going slowly; it had taken him an hour to outline a hole less than a third of the size, he estimated, needed to let him out of his icy prison. And he could feel the cold slipping into him much faster than that.

He had another worry. In all the thrashing and wiggling he'd done he hadn't managed to move his tail. Not at all. He couldn't even feel its tip any more. Chaos! He could deal with that later. He loaded another clip and resumed firing.

The hole he'd outlined was almost half wide enough for him to crawl out, if he could crawl, when Mary started moving again. She was doing something with the med kit.

There were, he remembered, some surgical implements in there.

Mary patted the roof of his mouth and he opened it. She wiggled out and sat in the hole, wrapped in the emergency blanket, blocking the occasional cold gust. Her face had some ugly yellow splotches, but her mouth was curved up at the edges and her teeth were showing.

"A little frostbite, the med comp says. And a busted rib. I'll live. Besides having had fish for dinner last night, how are you?"

How did she know what he'd had for dinner? Never mind. "My left leg is broken. And my tail is trapped. Mary, I may have to ask you to amputate it."

"Drin!"

"I can ignore the pain and the damage can be repaired, if I live." What worried him more was that, without his tail, or most of it, to counterbalance, he would have a very hard time moving, let alone climbing, on three legs.

"We're going to make it, Drin. Don't think anything else." Mary took a couple of deep breaths, exhaling clouds that would not have been out of place for him. "OK. How far back?"

A sudden roar outside stopped their conversation, and a warm gust blew into the hole. Another avalanche, Drin thought, or a volcano?

Then it stopped and he recognized it. Some kind of flying vehicle.

Friend or foe? There were eight rounds left in his clip. If he had to defend them, there wouldn't be enough to finish his drilling. If only Mary hadn't lost her weapon in her fall. But that couldn't be helped now. He would just have to make every shot count, then hope.

A bass Kleth voice rich with overtones ripped through the wind and snow.

"Over here!"

"Do Tor!" Mary yelled.

Drin let a breath out his blow hole in a great resonant honk, part for communication, part in relief.

Do Tor did not look like any Kleth Drin had ever seen before; he hopped into view in a heavy-looking black cape over a bright orange body suit, and wore a narrow peaked cap covering his crest. "They're alive," Do Tor yelled.

"Do Tor—" Mary's voice was down to a shout as Do Tor closed the distance "—Drin's left foreleg is broken and his tail is trapped."

"Damn right it's trapped," another voice declared, human this time. "That rock's got to weigh a hundred ton!"

Drin placed the voice quickly, making up for his lack of recognition of Do Tor. The human with the Kleth was Yohin Bretz a Landend, the erstwhile Thet City harbor pilot cum primitivist cruise ship captain. What was he doing here?

"They've got some big pneumatic jacks back at Gonikli's place," another human voice shouted. It took Drin a while to place it, and he groaned at the irony when he did. After chasing him a quarter of the way around the planet and getting hopelessly trapped, Richard Moon had come to him. Now, was the human writer back at the scene, or should he scratch another suspect?

"They're heavy to get down here." A Do'utian. Gonikli of course.

"Get rocket crane from Pahn No City." Do Tor suggested.

Gonikli wailed and Drin knew why. It would take a day. They'd been here before. Crazily, it was less worrisome to him being the one trapped than being one of those who might try to rescue him.

"Cut me out," he said.

"Fish man, you want to come out in two pieces or one?" Yohin yelled. "I can get you out in one."

"Huh?" just about everyone else said.

"I got me ten four-line tackles back on the ship; each line'll pull three ton. We anchor them to that crag and blast some anchor bolts in the rock. Ought to do'er. Your heavy weather flyer there can lift the gear if the rest of us stay here. Just tell my crew."

Silence.

"What is a 'ton' in cufs?" Richard Moon finally asked.

A cuf, one Trimus unit of force, is one dom-charter-unit-per beat squared (567.45 Kleth go-bo; 37.06 newtons, in human base ten; or 1.85 E-5 Li'in, in Do'utian base 12). In terms of the archaic human unit "ton," which is still embedded in English literature, it would take about four eight-squared (400 octal, 256 decimal, 194 base 12) cuf to make a "ton."

—The Compact and Charter of
Trimus, Technical appendix

"We're fighting the wind, and the cold's makin' the lines hard. Best move when you can, Commander," Yohin yelled.

Gonikli and Borragil'ib cleared away the rubble in front of Drin with beak shovels, and gave him a clear path out from under the rock. He had no idea of how his hind legs would respond after having been trapped all these hours. Incredibly, it was still light out. He felt like he'd been entombed in ice for much longer.

"All right, me hearties, pull!" Yohin yelled.

Gonikli and Borragil'ib pulled on the archaic tackles. The lines pulled taught. Something shifted.

"More! Dig in, mates, now!"

The pressure on Drin's tail suddenly lifted and feeling returned there—so painfully he wished it hadn't. He tried to push himself forward, and collapsed on his broken left foreleg with a groan.

"Come on, Commander," Yohin shouted through the gale, "Hurry—it's all we can give you."

Drin tried to raise his forequarters up on his one good forelimb and slide, or squirm forward. He began to lose it again.

Mary darted under him, and pushed up and right. It was impossible. She couldn't lift any part of him. He was far too massive. But he shifted as much of his weight to his right foreleg as he could and somehow she kept what was left off the ice. Almost without thinking, Drin pushed himself up, snapped his right foreleg ahead, dug his claw into the rubble before he had time to fall, and pulled. Something broke free, his left rear claw pulled clear and he thrust it forward, scraped a foothold in the ice, and shoved his head out of his prison. Mary tumbled out of the way as he came crashing down on his throat and chest and slid the rest of the way, pushing with his hind legs.

"Loosen up there, maties, he's out! Easy now, easy," Yohin shouted.

Clear of the rubble, Drin watched Mary scramble out before the hole they'd been inside collapsed with a thud and a spray of snow and ice shards. She waved at him, then ran for cover.

Cover was a huge tent inflated in front of him, dented only slightly by the wind, set beside a low, rugged-looking ducted fan aircraft, bristling with vector nozzles. Gonikli was beside him instantly, and stuck her beak under his left shoulder. Supported that way, they were able to stagger into a warmth that normally would have been very uncomfortable, but just then was very, very welcome.

No sooner was he on a heated pad, then Go Ton hovered over him like a fury, poking this and that needle into him. All feeling left his left foreleg, except for various tugs and pulls from Mary and Gonikli under Go Ton's clucking supervision.

Richard Moon managed to bring him a Do'utian field ration cube that must have weighed as much as the human male that carried it. Drin took it and stuffed it down his gullet. Soon its sugars and enzymes found their way into his blood. Gradually, his head began to clear.

Everyone was standing around him, looking concerned, and waiting for him to say something. "OK. Thank you everyone." His voice sounded weak and raspy, even to him. He coughed. "I think I'll live. I was trying to reach Mary when something or someone—a human I think—toppled me into the crevasse. You saw the rest. But what happened while we were out? In light of our investigation, this is a rather interesting rescue party!"

Everyone started to speak, but Gonikli said, "Please" a little louder than everyone else.

"This is my fault. At least in part." She rubbed the tent floor with her beak. "I ended my dear friend Bi Tan's life because she was dying, and begged me to do it. She called me to her retreat—she was very private, avoiding almost everyone, when she was away from Zo Kim. She was unhappy with him and unhappy without him, and tended to pick fights like the one with Gorman over including his contacts with Lord Thet's sailors in her manuscript and . . . I'm wandering.

"Bi Tan told me that Zo Kim was dead, and she wanted me to—help her go. She was shaking, jerking around, but she gave me a few more changes to our last chapter—about crude replicator manufacturing showing up in Thet City. She was sure that would upset people, and make them remember her. Then she begged me to bite her head off—she placed her head in my beak, told me I was the best friend she ever had, and to do it quickly because the pain was terrible.

"It was awful. But in a way I felt honored, that she would ask me to do it instead of another Kleth. But I'll never forget the bitter taste.

"I went back to the writer's colony and asked someone, it might have been Gorman, to take care of Bi Tan's body. He and the others said they'd take care of it.

"I called Richard before the awards meeting and told him, so he could say something about her. When I found out that Zo Kim had died at the awards meeting, I didn't know what to think. Everyone knew what I thought of Zo Kim. But, but Bi Tan was my friend. I would never have done that to her to get at Zo Kim—"

Drin felt a surge of sympathy—Gonikli was an innocent academic caught in a web of alien intrigue. Borragil'ib curved his tail around her. At last she stopped shaking and spoke.

"When Drin came to ask questions, I came out here, to talk to our . . . to Bodil. You think I'm crazy, but it gives me a kind of peace to pretend she's listening, still. . . ."

Borragil'ib touched his tail to Gonikli's again. She lowered her beak.

"Commander," Borragil'ib said. "I didn't know the full story and suspected some other motive on your part. My apologies."

"That takes us to Richard," Mary said, redirecting the subject. For me? Drin wondered. Did she sense his embarrassment and beak-dragging sadness at this?

Drin saw that she had some flesh-toned ointment over the spots on her face, and seemed perfectly normal otherwise. There was no way she could have what she had done, lifting almost a quarter of his weight . . . but he was here.

"Yes," Richard Moon said. "I was surprised that no one had notified me about Zo Kim's passing, but was prepared to make the sad announcement and present the award myself when Zo Kim came flying in, right on schedule! I was flabbergasted and horrified. I didn't, myself, know that Bi Tan was dead, I'd just trusted what Gonikli had told me and had assumed Zo Kim was dead, too."

"Did anyone," Mary asked, very quietly and gently, "think of reporting this to the Monitors?"

"Yes, we did." Gonikli looked puzzled. "Gorman took care of it before he left for Trimus City. He'd had words with Bi Tan when some of her critiques of his work from their group showed up in Zo Kim's reviews, and he was, well, a little more cold blooded about it all. The rest of us were in a bit of a mess."

"When Zo Kim died on stage," Richard Moon added, "I knew I had to see Gonikli before you Monitors did. I found a way to go back to Hot Springs Island that didn't expose me to any records."

Wind, wood, sail and nothing else, Drin remembered. The face in the rigging.

"Aye," Yohin chortled. "So ye did. People pay my agents the usual way, which makes the usual record, but ye volunteered for crew. And did good of it, too!"

"When," Richard continued, "I didn't find Gonikli on Hot Springs Island, I talked Yohin into coming up here."

Something in the back of Drin's mind was bothering him. Quite beyond Zo Kim and Bi Tan, there were two other felonious assaults to worry about, the victims being Mary and himself! What was the connection?

"Everyone?" he said, finally. "We are in the bottom of a crevasse surrounded by avalanche-prone mountains. Mary was shot by someone, who, incidentally, may have started the avalanche that buried me. Presumably that act flows from nobody in this tent, but just now that isn't such a favorable current. I suggest we get back."

"Stendt." Do Tor said, ignoring Drin's call for motion.

"Who?" Mary sounded surprised.

"Human Gorman Stendt. Quarrels with both Kleth. Present on Hot Springs Island at time. Didn't tell monitors until Zo Kim not *just* dead, but humiliated, ruined, in front of everyone. Maybe he lied to Bi Tan about Zo Kim dying."

Drin waved his beak in negation. "Stendt was with others at the colony when Bi Tan died, then he was at the awards ceremony in full view when Richard Moon got the call and Zo Kim flew in and died. Bi Tan carried no comset with her—someone who was there would have had to tell her the lie."

"He's here, too," Yohin offered. "Least he came on my ship. Ye can ask him yourself."

"But why would he try to kill Mary?" asked Gonikli, "Just because she was investigating? That would be too stupid for Gorman."

"Whoever it was didn't really try to kill me," Mary said. "The dart knocked me out where I'd fall into the crevasse, but the fall wasn't that much for a human, and it was on a snowy slope near the valley wall, an old avalanche site I think. The only thing I could think of is that he wanted Drin to come after me; and that's what happened. Then, with both of us trapped down here, everyone else would come. . . ."

Do Tor and Go Ton weren't waiting to hear the rest. They were getting in their flight suits again.

"Can we fix a crutch for Drin?" Mary asked. "We really should get out of here."

Good idea, Mary, Drin thought. If not their antagonist, there was always Trimus's unstable geology to worry about. But his inflatable splint was not going to hold any weight.

"Got an idea for that," Yohin said. "Need to get outside first. Get some wet towels—soak 'em."

Outside, Yohin wrapped the towels, one by one around the inflatable cast, where they quickly froze solid in the frigid wind, forming a rock hard composite casing around his lower leg. The inflated splint insulated the inner towels from his leg and distributed the pressures to its icy shell. Within minutes, Drin found he could put his weight on it and walk, in a sort of limping, peg leg manner.

The Kleth packed the tent into the aircraft and roared off into the teeth of the storm, hoping to spot their antagonist, or at least dissuade whoever it was from starting more avalanches.

Drin was in no shape to negotiate the mountain pass they'd taken to the glacier. To move, he had to swing his splinted leg forward, plant it, step with each of the other legs in succession so that at least two other legs were always firmly on the ground, then swing it forward again. They decided the quickest route back would be down the glacier to the sea. Borragil'ib arranged for another aircraft to meet the humans at the glacier foot. The Do'utians would swim home.

Borragil'ib led them toward the ramp he'd built to tend Bodil's resting place. It was, of course, on the side of the crevasse opposite the one Drin and Mary had found themselves. Their procession was single file for Do'utians, and Drin's hobbling gait slowed everyone down.

They passed Bodil's body, now just a hump in the snow on the floor of the crevasse. Borragil'ib didn't stop—a kindness to Drin. Drin reflected that Go Zom had observed in his commentaries that Do'utian memories are excellent, but that their manners were better.

Finally, they crawled out of the crevasse and started down the main glacier. The snow slowed them down even more than Drin's leg. As they got closer to the water, it fell and fell. Drin was surrounded by a deep red fog—what light there was now came from Ember only—and that glowing dull red through layers of cloud. It was very, very dim. Drin's audio imaging helped a bit, but the snow absorbed that too. He followed Borragil'ib's tail with one eye, and Mary behind him with the other, all the time expecting the mountain to come crashing down on him again.

It was sheer chance that he happened to be looking in the right direction. It was training preparation and worry that had his gun loaded with knockout and in his mouth, rather than in his pouch. They'd just reached the rim of another open crevasse when the snow lifted momentarily, and Drin looked back to his left.

He saw the long tube, he saw the black beard, opened his mouth and fired.

"Everyone," he shouted, "Commander Drinnil'ib. Break silence, I've just tranked a human. He was lying in ambush with some kind of weapon."

Mary was on top of the assassin in a minute. "Drin, it's Stendt! And I've found a launcher. It's been fired!"

"Sheet!" Yohin exclaimed, barely audible. The heavy snow was swallowing everything. "Where are the bird men?"

"Do Tor, Go Ton? Come in," Mary shouted. There was no answer. "If they've been hit, they're nearby. Stendt didn't come far so soon carrying this."

"I understand," Drin roared back against the wind. Pollution! Drin's Monitor com was down in the crevasse. Mary had lost hers in her fall. "Borragil'ib," he shouted in Do'utian, using a range of frequencies evolved to cut through polar storms, "can you call and get a fix on the aircraft?"

"Commander?"

"Emergency channel, and give the operator code five, seven, two, D, nine."

"Nine, seven, two, B, nine?"

Drin tried to shout as clearly as possible. "Five—Seven—Two—Delta—Niner"

"Got it." There was an interminable wait. Then Borragil'ib said, "The Kleth monitors are over the ridge, eight-squared charter units. Commander, they are down, but they managed a safe landing."

"Mary, Do Tor, and Go Ton are safe." Drin shouted. He looked up and saw a star on the west horizon just south of the flat ruddy dome of Ember. It was Aurum III, where these makers of harpoons and rocket tubes should have gone. The storm was lifting, but clouds of question remained.

Stendt had not been aiming his weapon at Drin, but at Gonikli'ibida.

Check the obvious. Especially the obvious.

—Planet Monitor's Handbook,
Forensic Methodology

"We didn't," Do Tor admitted, "recognize the rocket launcher for what it was until much too late."

Drin gingerly adjusted his position on his pad so that he could see the holoscreen on the wall opposite Mary's pool in his estate room. Do Tor shuddered in the wind shadow of their damaged aircraft, already dusted with blowing snow—Kleth needed to keep active at low temperature.

The Kleth monitor panned the damage with his comset's tri-ocular video pickup. The digital holographic reconstruction was clear and sharp, probably a little bit better than the raw data, Drin reminded himself—like the untrained eye, cybernetic pattern recognition and reconstruction programs sometimes filled in detail that wasn't there. But this one seemed straightforward enough. One of the blades of the port fan of their delta-shaped aircraft had been bent straight up, rim and all. The two adjacent blades were bent away like the skin of a steelfish filet.

"It must have taken great skill to land the aircraft on its nose and starboard fans alone. So you saw the launcher?"

"Oh, yes," Go Ton said. "Looked like a telescope, or something optical. Then whoosh and bang! Do Tor bailed out and held the port wing up while I eased us down. Saved evidence."

"Well done, but you look very cold," Drin observed. "You could finish your report when you get in." A splash and a light laugh reminded him that the other half of his team was now very warm. Mary had invited Richard Moon for a swim and some gentle fact finding.

The harem-instinctive part of Drin's brain was putting out discomfort hormones at the sign of Mary being physical with someone else. Realizing this, with beak closed, Drin told himself more again and again that Mary was not in the "harem/mate" category, but more like "family/sister." Getting a sister into someone else's harem before her biology forgot that she was a sister was a major theme in Do'utian literature. Do'utians were less susceptible to mutations than humans, but exogamy still offered more possibilities. And for more of their history, obligations to the bridal family had been what tied beaches together into loose trading confederations, despite combat between their beachmasters. A sister in the harem was a traditional sign of weakness, but even in the best of families—Drin shuddered.

Bodil, with her ravenous intellect and passionate will, had attached herself to the long discredited idea that harem imprinting was really a cultural, not biological, thing which intelligent beings could choose to disregard. Curiosity had burned in her, and she had begged him for the experience. She'd seen nothing disgusting in doing what nature had evolved them for, had no fear of the minor pain involved, and no qualms about discarding any eggs.

Drin had been curious, too, but had been unwilling to shorten his tail to satisfy it. But Bodil and Gonikli had caught him alone, outdoors, in season, one day and teased him into "just acting it out." They could always stop. But the hormones they triggered had washed through him and his mind had been a semiconscious observer to the tragedy.

He exhaled as if to discharge the memories—there was work to do now. He stared at the damaged aircraft on the wall screen, picking out details—there were dark things in the white composite hull here and there—he forced it to take back his attention.

"It looks like pieces of the rocket are embedded in the hull."

"Oh, yes," Go Ton agreed. "Think the fan cut off guidance head and threw it into hull—see hole just above wing—before explosion."

"Best get data to you now," Do Tor suggested. "That rocket launcher is a puff in an updraft. It appears that Lord Thet has guided weapons now. Cybernetics and A.I. maybe."

"Good enough," Go Ton added, "to force us to kill many of them if we attempt to remove them."

Drin nodded. So it had come to that, Drin thought. When this had started, Thet had a farcical primitivist city-state dictatorship run with sharp steel sticks and the kind of nihilistic charisma ancient humans often fell for. In some respects, they were a herd animal, and untrained minds were prone to follow those who spout pretty mist. Primitivists generally came from romantic young people who, knowing little and hostile to learning, fell back on their instincts. In this case; follow the alpha male.

Evolution had prepared Do'utians to be more self-assertive. But there were, Drin reminded himself, difficulties to indulging that mode of behavior as well.

"The Council will not be amused. But what is the connection to this case?" Drin asked.

"Drin," Mary yelled from the pool. "The connection is that Stendt had one!"

"Oh, yes." Go Ton agreed.

Drin thought, or tried to think. He was swimming in a whirlpool of data. "Very well. He needed a weapon like that, so he got it from them. And, because it was of Thet City manufacture it doesn't show up in the Trimus permit files. This makes sense for Stendt, but. . . ."

"Councilor Drinnil'ib," Richard Moon spoke up. "Gonikli'ibida and Bi Tan had been working on a report about primitivist weapons manufacture—and Zo Kim's criticism was scaring off any potential editors."

I must be swimming through a swamp of pollution, Drin thought. "So Gonikli'ibda told you and Stendt that Bi Tan was dead in order to kill Zo Kim? Having the information come at him from two sources like that would probably convince him. But she knew that would kill Bi Tan, too." Drin touched his beak to the carpet. The Gonikli he knew was incapable of such callousness.

"Big puzzle," Do Tor agreed. "Who told Bi Tan that Zo Kim was dead? If no one could have done this, one terrible answer is that *no one* did. Must test at the hearing."

The sound of the aircraft approaching cut through the gusts of polar wind picked up by Do Tor's comset. "The replacement fan is finally here! We need to sign off now and help dismount it. We'll have evidence of smart weapons back to you in an hour or so."

Drin sent them off with a "smooth air" and turned an eye toward Mary. She was sitting in the shallow end of the warm pool with Richard Moon, whose yellow mane now lay wet and flat on his skull, making him seem thinner and more athletic. Now that he was firmly off the suspect list, Mary had, in effect, recruited him to help with the cybernetic tendrils of discovery that this case had grown. Their data trail now ran to Lord Thet's city state. But not continuously.

"Drin," Mary called. "Maybe if we all get our minds off the case for a while, something will happen—mmm, Richard—below the conscious level. Drin, why don't you come over here? There's something I'd like to share with you, and Richard's willing."

Drin hesitated. Mary was offering to balance books, he realized. Eight Trimus years ago, Mary had watched, and helped Drin help deliver eggs from two very gravid, very feral members of a Do'utian primitivist beach harem. This exposure of Do'utian intimacy, though accidental and involuntary on his part, had always embarrassed him. Mary, however, had called it beautiful and natural.

She was unafraid of limits, and enjoyed testing the boundaries of experience and convention—and in Richard Moon, had found a kindred human spirit. Despite himself, he was intensely curious. He said a soft command in old Do'utian to the cybernetic servant to isolate the eyes and ears of his walls, and moved, gingerly still with his left foreleg in a Do'utian walking cast, over to the human pool.

Mary and Richard Moon were facing each other, teeth bared, and periodically biting, or pretending to bite each other, usually each other's mouths, but sometimes other parts of their bodies.

"Drin," Mary said, laughing, as happy as Drin had ever seen her, "put your hands on my shoulders and hold me, so I don't float away."

He sent his tongue out and did as she requested. Her body tasted different, somehow. Richard Moon patted one of his hands in a gesture that meant "welcome" in any body language that Drin knew.

"Drin," Mary murmured, "remember how I cradled and washed the eggs you took. I hope this feels as good and as special to you. Oh, Richard! Yes, yes!"

Something tense and warm seemed to flow from Mary into Drin as he held her while she accepted Richard Moon's seed. However different it was for humans—Mary, for instance, would not produce eggs without a reproduction permit, and humans actually did this for pleasure rather than to survive a pain-driven biological necessity—the concept of sharing intimacy, of balancing what each had experienced with the other, appealed to Drin as did in general the idea of touching her intensely warm body and sharing good things with her.

He shut his eyes and memories of Bodil and Gonikli and that summer night before he left for his monitor training on the beach across the bay came roaring back. Terrible memories then, but now, somehow, rendered less terrible. Here on Trimus, he mused, we have chosen to remain biological beings, with all that implies. In a way, he pitied the life-descended machine intelligences that roamed the Galaxy like gods. Fate is not always kind, but at least we still know what we are, he told himself.

When Mary laughed and said he could go now, that elusive thought about machine intelligences had become a school in his mind, turning in unison this way and that. The dangers represented by the guidance system of the rocket that had downed Do Tor and Go Ton's aircraft was clear to him.

They may have seen but the air side of this ice.

"Mary, forgive my multi-track mind. I feel a, a completeness with you and Richard Moon that is philosophically beautiful—but only for advanced minds of both our species."

"Unfortunately," Richard agreed,

"you are right. Councilor, we will hold this among ourselves."

"On my other track, I also realized that we are up against opponents that do not understand discretion nor value the restraints under which we live."

"Restraints?" Mary laughed and Richard coughed. Drin had to puff a bit as well.

"Technological restraints," he added.

"Do you think the people that gave Stendt the rocket launcher might have given him more such toys?"

"Smart toys," Mary added. "We've deliberately held ourselves back from having artificial intelligences run everything—which is fine as long as you don't have to outsmart one by yourself. But why would Lord Thet show off his cybernetic prowess just to aid one customer? And what is Stendt's compact-cursed motivation?"

"He could be crazy," Richard speculated. "Or maybe Bi Tan was getting too close to the truth."

"Maybe." Drin reached a decision. "It looks like a battle is going to be fought on technological grounds. So I'm going to hope they are as ignorant of Do'utian culture and history as they act. If Do Tor is right, we know who killed Zo Kim and how. But we need to know why, or at least part of it. Uncontrolled artificial intelligences are involved and in the hands of someone like Lord Thet they are not just a danger to Trimus but to the whole Galaxy! I think Stendt is the key, and if we put enough pressure on Stendt, he may tip his hand—before he understands what he is up against."

"How?"

"Excuse me for a macrobeat or so. I must talk to someone privately." If he could. If that someone could and would still listen.

But all Do'utian tradition said that the top was where to go, especially if questions hung on the next long like seaweed. Drin had to persuade the long one that Stendt was someone to oppose. But Drin was convinced now that Stendt was not only the key to the deaths of Bi Tan and Zo Kim, but to a conspiracy to put illegal smart armaments in the hands of a charter-trampling chauvinist dictator.

Even from the depths of whatever thoughts he was thinking, the long one should respond to that.

The most significant difference among the three intelligent species was size. Do'utians were from five to six times the linear dimensions of humans and massed two to four eight-cubed as much. Humans, in comparable parts of their bodies, are about twice the linear dimensions and ten times the mass of we Kleth. But our brains have each evolved by natural selection to the point where they could understand the Universe well enough to end natural selection. So, despite a difference of almost a factor of a thousand in brain mass, Kleth and Do'utians have similar physical problem solving abilities.

—Go Zom's notes on the
Compact and Charter of Trimus

The main hall of the old dome was filled with the smells of sushi and the pleasant drinks of three species.

Three raised platforms waited for the Do'utian elite: himself, Commander Drinnil'ib, at the left, Beachholder Doglaska'ib in the center, and Borragil'ib at the right.

When Drin had met Doglaska'ib in person, he'd again been impressed with how huge the long one had grown since Drin's childhood. The conversation had been very short. A swiveled eye and a nod on the long-one's part. Then a turn to indicate the interview was over. But the eye had been clear and the nod had been definite.

The ancient one was in excellent shape, and climbed briskly to his pad. Drin and Borragil'ib followed and waited for the long one to speak. Two centuries ago he had opened a family fish hunt with an amusing story. But that was two centuries ago. All he said here was, "Begin the review."

A mind grows heavy with the burden of things past, Drin thought.

In the inevitable irony of such things, the one without the title, Borragil'ib, took charge and explained to the human and Kleth visitors how local review worked in Do'utian territory. Essentially, it eliminated worries of unsavory interrogation techniques, because all interrogation was done in front of the Master, his recording devices and everyone else. Anyone present could ask questions, but they had better be worthwhile, for if not, the humiliation could be as cold as the bottom of the Southern Rift.

Stendt was present, in dignified dress, sampling the sushi, and pretending affability—much good that it would do him. For all his apparent freedom, this suspect was in a prison of the watchful technological servants of Ibgorni, a house system that was, perhaps, more mentally alive than its master.

However, things were still unresolved. Stendt was in custody for what he had done to the monitors, and tried to do to Gonikli. There was still nothing to link him to the deaths of Zo Kim and Bi Tan, nor anything to trace the origin of the circuits of his "smart toys," as Mary described his weapon.

And if what Go Ton suspected was true, something very horrible had happened, something that powerful people wanted to hide. The rocket launcher was part of it. Lord Thet's colony had made it, and it was far from the primitive weapons he and Mary had seen eight squared turns ago.

After the preliminaries, Borragil'ib turned it over to Drin. Drin called for Gonikli'ibida.

"Mistress," Drin began, "you, and not me, were the object of the Mr. Stendt's murder attempts. I had passed him when I saw him on the trail. He was waiting for you."

Gonikli nodded. She was miserable, beak hung low, tail limp.

"There must be something you know, that he might kill you to prevent from being known. So important that he would risk killing Mary and me to draw you to us. So take us through it, again."

Gonikli did, saying what she had before.

"Please," Go Ton spoke up. "What was the taste like? And the consistency."

Gonikli shook her head. Mary's mouth opened in shock. Drin tensed. Do Tor and Go Ton had hinted something about testing a hypothesis at the review. But they had not reviewed this line of questioning.

Borragil'ib rose to his feet and Drin caught a whiff of challenge, understandable given the obscenity of the idea. Drin swiveled an eye at Go Ton, who held herself in the Kleth posture of certainty and self-confidence. He willed himself not to respond and instead focused his attention on Gonikli. "Gonikli'ibida. Our apologies. The discussion must be frank. We need your answer."

She looked up, involuntarily, as one would at a mate. It cut him to the core, the strength of that imprinting after so many years. He raised his beak. She would have to admit that she tasted the flesh of an intelligent being.

"It was bitter, maybe slightly salty."

"I think her body was not prepared to die." Go Ton announced softly.

Air rushed out from spouts and into mouths.

Gonikli'ibida moaned and waved her head from side to side. "No, she was dying."

She smelled sincere, and frightened. But Drin remembered what Go Ton had said when he applied the bite of mercy to Zo Kim. It had tasted sweet. Kleth and Do'utian taste organs were different, but the chemicals were the same and the biochemistry was similar, all races got internal rewards for ingesting high energy compounds. "Sweet" like "b-flat" meant pretty much the same to all.

"This is nonsense!" roared Borragil'ib, "Gonikli'ibida is no murderer. Kleth, you are a guest in this hall! Enough of accusations."

Drin thought furiously. If Do Tor was right, Gonikli had killed a perfectly healthy and unbereaved Bi Tan. The whiff of challenge sent from Borragil'ib had become the predominant odor in the room. He meant to defend his harem and his hall, or, Drin thought, defend his secrets under that guise. Gonikli could have killed for personal reasons, but she would not be involved in a plot involving uncontrolled artificial intelligence without her master's knowledge. Which meant, if there were Do'utian involvement, he was involved.

And that would be one of several explanations for his hostile behavior toward Drin.

Only because Borragil'ib's anger was directed at Go Ton, was Drin able to keep his head clear. The challenge scent was thick on the dais. Now Drin grasped the slippery eel of Do Tor and Go Ton's reasoning. If Gonikli wasn't lying—there was one other person who might be responsible.

"Please wait, Master Borragil'ib," Drin said as softly and controlled as he could. "This may not mean what you think it means."

Mary spun to look at Drin. Drin keyed the comset he'd left in his beak and whispered. "Mary, back to the wall. Watch Borragil'ib, and watch Stendt." Then Go Ton's head bobbed ever so slightly.

"Continue, Go Ton," Drin intoned. Borragil'ib remained on his claws.

Go Ton produced a syringe and injected herself. "I took general anesthetic. Now squeamish people look aside." With Kleth quickness, Go Ton took a small surgical knife, deftly bared a small patch on her arm, and sliced a not so small piece of flesh from it. Just as quickly, she put a standard tension dressing on it.

Do Tor's crest fell and his wings went a little out and back. But he said nothing. Go Ton was done before Stendt dropped his sushi. Drin glanced at Mary, who stared in open-mouthed shock.

As if what she had done was entirely normal, Go Ton approached Gonikli and held out the piece of herself. "Taste this."

Gonikli curled her tail, looked at Drin, who wondered if anyone but Do'utians could read her horrified body language.

"You are already forgiven," Drin said. "And the truth may save your reputation."

Still she kept her beak locked shut, and rocked from side to side.

Then, to everyone's amazement, Doglaska'ib himself rose wordlessly from his center pad and walked to Gonikli and Go Ton. He opened his beak and sent his hands to take the flesh from Go Ton and offer it to Gonikli. Trembling, she opened her beak and accepted it with a trembling hand.

"Is the taste the same?" Go Ton asked.

Gonikli nodded.

Then Go Ton did something Kleth do not do, save ones that have spent much time in the company of Do'utians and people. She stroked the distraught Do'utian woman's beak with her spidery hand.

"I am sorry and humiliated for my race," Go Ton said, in the perfect English that Kleth can manage for important occasions, "for what those of my race have done to you. You, and your friendship, were used in a way that is understandable only from the view of one driven insane by inner conflict. Bi Tan killed her mate by tricking you into killing her. Please accept my apology, and my affection. Your tail is longer than any of ours in this."

Bi Tan killed Zo Kim by deliberately tricking Gonikli into ending her own life? Opportunity and means. But motive? What was the motive for such desperation?

"Stendt," Mary said, softly. But Drin recognized the human body language—she was pure fury. "What, Gorman Stendt, was your role in this? You were involved, I think, because you told Zo Kim—and you told him at the conference before any word could come from the island."

Stendt looked around, eyebrows raised. "Why ever would you think there was any such role?" Drin surmised that he had not expected Mary's question. The room was silent, except that sharp ears might have heard Drin talking furiously on his comset, beak closed, to Monitor Central.

Drin finished his call. Mary was putting the pressure where it was needed. Now Drin would add a little more. "Stendt, you can answer Lieutenant Pearce now with dignity, or have it dragged out of you in what, I assure you, will be as humiliating an experience as the Trimus Council will permit!"

Stendt spread his arms. "All I did was show her an advance copy of her mate's review of her book, and when she reacted I told her that's how I felt about what they'd done to mine." He snorted in disgust. "The little harpies didn't even read the final version of my book, damn them!"

"Stendt!" Drin bellowed, on his legs, the scent of challenge pouring from his pores. An act, he told himself, or a catharsis to somehow make up for what he had done to Gonikli so many years ago by dispatching her current tormentor. "Truth! Or I shall ask everyone to leave but you and me!"

Mary took her cue, and walked toward one of the curtain doors, and motioned for Richard Moon to follow. That would leave Stendt the only human in the room. It was condescendingly chauvinist psychology, and Drin berated himself for it. But it would work on Stendt, he thought.

The suspect's head snapped left and right. He waved his arms up and down, full of disappointment. He had to realize that he was alone now. Perhaps he smelled the Do'utian contempt.

"Truth?" he asked, in a voice still filled with challenge. "What do you know of truth? And where is this so-called truth?"

"We have Zo Kim's effects, including his copy of the manuscript on weapons trade on which Bi Tan and Gonikli were working. Gonikli, did you keep Bi Tan's copy? It can't hurt her now."

The Do'utian woman reached into her pouch and produced a standard data module.

"It is a terrible thing to remember her by, but it was the last thing she touched. I—I needed to have something. To touch."

"A certified electronic copy of the review will do for evidence," Drin said. "The copy she gave you will help us understand her feelings. It is, no doubt, filled with classic Zo Kim sarcasm. But, I gather my human colleague suspects, *not* as he wrote it."

"So I made a few changes," Stendt said, still calm, still sounding as if he were in control. "That harpy mate of hers already said it didn't work for him and I just made that a little more clear, stronger. Improved the language, took out the weasel words and qualifiers. Hell, with the review as it was, their theories and her career, would never be taken seriously. She knew that. All I did was make it a little clearer, and suggest how she could end his career too. But she was already ready to do that, anyway. They didn't get along. It would have happened anyway, don't you see? With them living apart? All I did was to make a few changes—"

"It's about the weapons, isn't it?" Drin rumbled. "With Bi Tan, Zo Kim, and Gonikli'ibida all gone, that little secret would be safe until Lord Thet had himself a cybernetic war capability, wouldn't it? Just how are you involved?"

Stendt shrugged.

Drin continued. "Zo Kim said he'd suspected for days. That might have been even before Bi Tan had herself killed—the only one that could have planted that suggestion was you. The whole thing was one complex, premeditated scheme. Two birds with one stone, was it? You used them and you used Gonikli. Was your human ego worth so much?"

"There's more than my ego involved."

"Gorman Stendt," Borragil'ib asked, rising up from his pad on his limbs, claws bared. "Why have you troubled my family so?"

"I want an advocate," Stendt said, and Drin recognized a mocking tone in the human voice.

"I," the disembodied voice of Ibgorni answered, "am programmed to recognize the application of all Trimus and local Do'utian law in this and instruct you in its application. In this case, the law requires you to answer."

"A human advocate, in private," Stendt demanded.

"Privacy is for deceit," Borragil'ib said. "Are you trying to conceal arms manufacturing by the human primitivists? And if so, why? Any refusal to answer will count against you."

"Count against me? Because I'm human? Because I can't bully people around with thirty tons of blubber?"

Stendt looked to Moon, then to Mary, for sympathy. Human help.

Drin saw only hardness in the looks Mary and Richard gave Gorman Stendt. Only a chauvinist, Drin thought, would look for sympathy from only his own kind while standing in the middle of the most conservative ethnic establishment on the planet of Trimus. If there was a defense to be made for ethnic enclaves, here was where to make it. If there were excuses for racial pride, here, if anywhere, were beings that would understand. If one wanted to plead local autonomy versus the state, here was where to make the plea.

Drin could not help but let a belch escape his blow hole in the ironic humor if it. Borragil'ib caught Drin's eye and belched as well. The smell of challenge had faded to contempt. Mary glanced at Drin and winked. Go Ton and Do Tor exchanged a glance and a flap of wings as though, they too, had better things to do than sully their talons with this idiot.

Stendt's agitation faded and his false affability returned. He shrugged and smiled. "Primitivist is a relative term. In some respects you are primitivists, too. And fools before your own biological chauvinism, posturing to each other in this archaic pile of stone."

Drin's beak opened slightly, hands on his gun. But Doglaska'ib remained impassive. Do'utian eyes rolled to him—this was a blatant challenge, but the long one seemed to utterly disregard it. Was he too far gone?

"I don't get my missile guidance chips from Lord Thet," Stendt declared.

Huh? Stay with the plan, Drin told himself. "Where do they come from?" he pressed.

In answer, the lights in the hall faded to black and stones in the dome above groaned. Dust fell.

Sonar chirps filled the room. Everyone was on their feet and claws. Everyone except Doglaska'ib. Well, thought Drin. He had meant to force Stendt's hand, and here it was.

But the sophistication of this writer's attack surprised Drin. Were they in time? Had they underestimated the capacity of Lord Thet's resources? Why would Thet let Stendt have this much—unless Thet had much more already?

Drin was nervous, but took his cue from the long one. Drin had warned Doglaska'ib, and the long one, presumably, had done something. If he had really understood the danger.

Stendt's voice filled the darkened room with a dim glow, sinister to those who could "see" it fill space that way. "I don't get them from Lord Thet—that idiot gets them from me."

Both of Drin's hearts surged. The school of fish solidified into an iceberg. A mock fatfish had turned to stab his tongue with poison fangs. The hunter was suddenly the hunted. Pollution! His own chauvinism may have turned out to be as bad as anyone else's. How badly had he underestimated Stendt and overestimated Doglaska'ib's ability to respond. What backup did he have? Drin fingered his comset.

A burst of electrical fire burst from one of the wall sensors.

Stendt laughed. "I control the computer now. I suggest you do not try to use any electromagnetic devices."

"A product of your modeling computer," Mary stated, her voice a brief glow in the gloom.

Drin shuddered. He hadn't thought of artistic technology as real technology—it was, somehow, diminished, trivial. He hadn't recognized the multi-media writer for the consummate technologist he was, operating so far beyond the limits of the Charter. But, in retrospect, that's what he had to be to do what he did. So it was only a small step to have his system make smart weapons or even smart bugs—microbots to do his bidding. A saving grace was that if they could still, somehow, overcome Stendt, they would put Thet back in his place as well. But Stendt didn't act like the loser in this, and Drin began to wonder if some of his worst fears might be realized.

In the silence, Drin could hear the wind outside. But it was not quite loud enough to illuminate the room. Then a brief whoosh and a momentary flash of sound suddenly filled the room. A broken ceiling panel lying on the floor in front of the dais, where no one had been standing.

"I suggest that nobody try to move. I can drop a hundred tons on anyone here."

The sound flash had shown Gonikli moving slowly toward Stendt. He would kill her without a thought, Drin realized. Then they would both be dead, Gonikli and Bodil.

"Everyone, hold still," Drin bellowed. "He doesn't intend to kill us or he would have. Don't provoke him." Noise subsided. His voice revealed that Gonikli had halted. Thank providence.

Drin rolled an eye toward Stendt. "What do you want?"

"Good thought, Councilor. Now, I suggest you turn over to me all recording modules of the research that Gonikli and Bi Tan did right now. I have your main computer, you see. I also have the structure of your dome, and this whole complex in my hands."

Drin glanced at the ceiling. It moaned, as if its vast panels were adjusting themselves to Gorman Stendt's will. Drin's faith in his heritage readjusted itself as well. Perhaps Doglaska'ib had decided to ignore Drin's warning. The long one's mind was not what it used to be. Or, despite his efforts, had the human's bootleg microcircuits and software actually succeeded in taking over?

Drin raised himself. "You can't destroy all the evidence by killing us," he said, not sure if he believed his own words. "Copies of our files, and those of Bi Tan and Gonikli, are in Trimus City."

"Then get on your comset and have them deleted, Councilor-Commander of Monitors." He laughed. "I'll be able to verify it from here—and your systems are too stupid to lie to me. Evidence? We're beyond that concern. I just don't want anyone else doing what I've done. As for killing, why kill what I can control?"

There was a collective grasp. "That kind of threat will get your mind reeducated," Richard Moon said. "Give it up, Gorman. Save yourself while you can still take it back."

He'd gone too far for that, Drin thought. The human had gone much to far to avoid reeducation. Drin smelled rage and swiveled an eye to Borragil'ib. "Hold it in, cousin," he whispered. "A charge here could cause dozens to die." Then Doglaska'ib's mouth opened slightly, just enough for Drin to see an everything-is-all-right sign made by one of the long one's hands. What? The long one still didn't comprehend what was happening?

"There's no going back now." Stendt's voice had lost the tense overtones, the edge Drin had come to recognize as the equivalent of the challenge scent. It was as if he were already contemplated the burdens of his ill assumed leadership.

"I'll give it up when I'm tired of it," the human continued. "If any of you have learned anything from my human histories, you've learned that we progress through the acts of great individuals. People with an integrated, holistic vision of the way things ought to be and the ability to seize the day.

"In the meantime, the thirty-century stagnation of Trimus is over. Its population, or at least its human population, will be allowed to evolve toward their natural destiny, without the constraints of the Charter. Why providence selected me, I do not know. But I am a consummate artist in nurturing simulated worlds—now I shall nurture a real one. What you have to understand is that I am in charge now. Here and eventually everywhere on Trimus."

The lights came back on and dust curtains leapt into operation. Stendt looked around in confusion.

"Not exactly." The voice of Ibgorni echoed from the dome. Cleaning robots whirred to remove the pieces of fallen ceiling.

"I've played along with you," the Do'utian cybersystem continued. "Your toys are now, and have been, under my control, but it was useful to see what you would try to do with them. That last offense of yours will be sufficient to force appropriate measures by Trimus authorities. We will not have to concern ourselves with disciplining a human here, which would be best for all."

Drin settled back down, spouting relief. The voice was Ibgorni, but the words, in their understated humor and confidence, were Doblaska'ib's. The long one had simply found a traditional Do'utian way of handling the situation—a tradition of living with cybernetic servants that was as long as Stendt's race had existed. One which their ancestors had not entirely given up when settling Trimus. A human might have called it fighting fire with fire. With no conviction and no punishment, there would be little public exposure of the Ib family, nor what Ibgorni had apparently become. Drin was relieved at that as well.

The scent of relief flooded the hall. Mary bounded up to the stage to nobody's objection and flattened herself against Drin behind his left eye with her mouth near the tight hide that covered his high frequency ear.

"Drin, who's really in charge here? Doglaska'ib? Or Ibgorni?"

He shook his head slightly. It was not a question he could answer. How deep was their connection—over the centuries, had Doglaska'ib's ancient body and the cybernetic system become merely different vehicles for the same mind? With the body trotted out when ceremony demanded? How long would that continue?

Drin looked at Borragil'ib. Perhaps until that one had grown long enough. Or was challenged. Drinnil'ib, himself, was a possible challenger—though far down the line. He had a vision of a future in which he tired of being Councilor-Commander of the Monitors, and came home—to something like this. Would Mary fit into—*this*—if he did?

Could Doglaska'ib see that too?

And what connection, Drin asked himself, did the long one have with the others, out there? Perhaps Trimusians were being watched—allowed to be themselves, but within limits? Who monitors the monitors, and who monitors *them?*

Drin had a vision of himself as part of a philosophical food chain of paternalism. What was on top? Was there indeed a point to it all? And what if he someday decided that, at least for him, there no longer was any point?

Mary shoved him to get his attention.

"Excuse me, Mary. Lost in thought."

"Drin, who's in charge? . . . "

As if in answer to Mary's question, Doglaska'ib's biological voice echoed in the hall for the second time. "Human Gorman Stendt is remanded to the custody of the Trimusian authorities. His cybernetic devices here and elsewhere are deactivated. The review is over." ■

(EDITOR'S NOTE: Trimus was also the setting for "Poles Apart" [*Mid-December 1992*] *and "Network"* [*February 1994*].

Charles Sheffield

THE LONG-TERM FUTURE OF THE UNIVERSE

1. *THE NEGLECTED FUTURE*

Stories about time travel notwithstanding, most people agree that the past cannot be changed. What's done is done. "The moving finger writes: and, having writ, moves on. Nor all thy piety nor wit, shall lure it back to cancel half a line."

The future, on the other hand—the place where we will live for the rest of our lives, and humankind the rest of its existence—*can* be changed. By our acts, we select from a very large number of possible futures. As the physicist Denis Gabor has pointed out, *the* future cannot be predicted; but *futures* can be invented.

A logical being might conclude that humans spend little time worrying about the past and a great deal of time thinking about the future. Oddly enough, the exact opposite seems to be the case. Although every adult is encouraged to make a will, a remarkable number of us decline to do so. And while schools, from kindergarten to graduation, expect students to spend much time learning the early history of their country, few or no school courses discuss its long-term future.

Maybe we hate the idea that we and all we know will go the way of Nineveh and Tyre; or maybe it is a more practical reason. The past seems, at least in principle, fully determinate; the future, quite unknowable. Certainly, more serious thought has been given to the past of the Universe than to its future. Yet, provided that the laws of nature have not changed and will not change, we can actually say a great deal about both.

Those laws seems to have been the

same in the past as they are now, and it is difficult to see why they should change in the future. At this point, however, I will make an explicit assumption; *future intelligence will be unable to change the basic laws of physics.* I am not totally convinced that this is true, and I have explored in fiction an alternative assumption.[1]

Two other points need to be made before we get going. First, we will deal with large-scale and long-term predictions, rather than "Tomorrow afternoon you will meet a dark and handsome stranger," or "Beware of making a substantial financial investment any time this week." We will discuss the fate of the Earth and of the Sun, and of the Universe itself. Will the Sun shine "forever," or the Earth endure forever? Most people would say no, on the general principle that nothing lasts forever. On the other hand, what about the Universe itself? It seems even harder to say what might come *after* the end of the Universe than to accept the notion of its immortality.

Second, although our prime interest is in the far future, we will not be able to get there without reviewing a few facts about the past. This will be done in summary form, since I have written about the past in some detail elsewhere.[2]

2. A LOOK AT THE PAST

The Sun condensed from a large, diffuse body of gas, mostly hydrogen, about five billion years ago, and the Earth has been circling it for about four and a half billion years. Both exist in a Universe that according to the so-called Standard Model of cosmology began in the "Big Bang," a monstrous expansion from a state of enormous density and temperature somewhere between twelve and twenty billion years ago. While there is no consensus and much discussion of the age of the Universe as measured from the Big Bang, there is widespread agreement on the reality of the event itself.

If the Universe has existed for maybe fifteen billion years, what was there before the Universe existed? This is a reasonable question, but not an easy one. Modern science, if it offers an answer at all, says that nothing was there, nothing at all, no time and no space. Most scientists, however, do not believe that the question itself is meaningful.

What else do we know about the history of the Universe? In cosmological terms, what happened after the Big Bang and before today, and *when* did it happen?

Let us run the cosmological clock backwards. The first thing that we note is that from observational evidence, distant galaxies are receding from us, and the whole Universe is expanding. Thus when the Universe was younger, it was smaller and it was also hotter.

In a hot enough environment, atoms as we know them cannot hold together. High-energy radiation rips them apart as fast as they form. An important time on our cosmological clock is then the epoch when atoms could first form and persist as stable units. Although stars and galaxies could not yet exist, at least the Universe would be made up of familiar components, almost all of them hydrogen and helium atoms.

Atoms could form, and hold together, somewhere between half a million and a million years after the Big Bang.[3] Before that time, matter and radiation interacted continuously. After it, matter and radiation "decoupled," became near-independent, and went their separate ways. The temperature of the Universe when this happened was about 3,000 degrees. Ever since then, the expansion of the Universe has lengthened the wavelength of the background radiation, and thus lowered its temperature. The cosmic background radiation discovered by Penzias and Wilson, with maximum energy at 2.7 degrees above absolute zero, is nothing more than the radiation at the time when it decoupled from matter, now grown old.

Continuing backwards: even before atoms could form, helium and hydrogen nuclei and free electrons could exist; but they could not remain in combination, because radiation broke them apart. The form of the Universe was, in effect, controlled by radiation energetic enough to prevent the formation of atoms. This situation held from about three minutes to one million years A.C. (After Creation).

If we go back to a period less than three minutes A.C., radiation was even more dominant. It prevented the build-up even of helium nuclei. As noted earlier, the fusion of hydrogen to helium requires hot temperatures, such as those we find in the center of stars. But fusion cannot take place if it is *too* hot, as it was before three minutes after the Big Bang. Before helium could form, the Universe had to "cool" to about a billion degrees. All that existed before then were electrons (and their positively charged form, positrons), neutrons, protons, neutrinos (a massless or near-massless, chargeless particle) and radiation.

Until three minutes A.C., it might seem as though radiation controlled events. But this is not the case. As we proceed farther backwards and the temperature of the primordial fireball continues to increase, we reach a point where the temperature is so high (above ten billion degrees) that large numbers of electron-positron pairs can be created from pure radiation. That happened from one second to 14 seconds A.C. After that, the number of electron-positron pairs decreased rapidly. Less were being generated than were annihilating themselves and returning to pure radiation. After the Universe cooled to ten billion degrees, neutrinos also decoupled from other forms of matter.

Still we have a long way to go, physically speaking, to the moment of creation. As we continue backwards, temperatures rise and rise. At a tenth of a second A.C., the temperature of the Universe is 30 billion degrees. The Universe is a soup of electrons, protons, neutrons, neutrinos, and radiation. As the kinetic energy of particle motion becomes greater and greater, effects caused by differences of particle mass are less important. At 30 billion degrees, an electron easily carries enough energy to convert a proton into the slightly heavier neutron. Thus in this period, free neutrons are constantly trying to decay to form protons and electrons; but energetic proton-electron collisions keep right on re-making neutrons.

We let the clock run backwards. Now the important time intervals become shorter and shorter. At one ten-thousandth of a second A.C., the temperature is one thousand billion degrees. The Universe is so small that the density of matter, everywhere, is as great as that in the nucleus of an atom today (about 100 million tons per cubic centimeter—a fair-sized asteroid, at this density, would squeeze down to fit in a matchbox). Modern theory says that the nucleus is best regarded not as protons and neutrons, but as *quarks,* elementary particles from which the neutrons and protons themselves are made. Thus at this early time 0.0001 seconds A.C., the Universe was a sea of quarks, electrons, neutrinos, and energetic radiation.

We can go farther, at least in theory, to the time, 10^{-35} seconds A.C., when the Universe went through a super-rapid "inflationary" phase[4], growing from the size of a proton to the size of a basketball in about 5×10^{-32} seconds. We can even go back to a time 10^{-43} seconds A.C. (called the *Planck time),* when according to a class of theories known as supersymmetry theories, the force of gravity decoupled from everything else, and remains decoupled to this day.

That's as far as I want to go. In fact, we are already far beyond the realm in which the physical laws that we accept—and can test—today might be expected to apply. The times mentioned are shown in TABLE 1. Note that all these times are measured from the moment of the Big Bang, so t = 0 is the instant that the Universe came into being.

TABLE 1

Event	*t*
Gravity decouples	10^{-43} seconds
Inflation of Universe	10^{-35} seconds
Nuclear matter density	0.0001 seconds
Neutrinos decouple	1 second
Electron/positron pairs vanish	30 seconds
Helium forms	3.75 minutes
Atoms form	1 million years
Galaxy formation begins	1 billion years
Birth of Solar System	10 billion years
Today	15 billion years

TABLE 1 possesses one inconvenient property. Everything seems to be crowded together near the beginning, and significant events get farther and farther apart in time as we come closer to the present. This is even more apparent when we recognize that the origin of the Solar System, while important to us, has no cosmic significance. Nothing much happened in the past fourteen billion years. A sobering thought, for beings who believe that what happened yesterday was significant.

Let us seek a change of time scale that will make important events more evenly spaced on the time line. We make a change of the time coordinate, defining a new time, T, by $T = \log(t/t_n)$, where t_n is chosen as 15 billion years, the assumed current age of the Universe.

TABLE 2

$T = \log(t/t_n)$, where t_n is chosen as 15 billion years

Event	*T*
Big Bang	$-\infty$
Gravity decouples	−60.7
Inflation of Universe	−52.7
Nuclear matter density	−21.7
Neutrinos decouple	−17.7
Electron/positron pairs vanish	−16.2
Helium forms	−15.3
Atoms form	−4.2
Galaxy formation begins	−1.2
Birth of Solar System	−0.2
Today	0

That produces TABLE 2. All the entries in it are negative, since we have been dealing so far only with past times. Also, the entries for important events, in cosmological terms, are much more evenly spaced in T-time.

We will put TABLE 2 to one side for the moment, and will return to it later. Let me only point out two things. First, we can't get all the way to the Big Bang itself in T-time, since that would correspond to a T value of minus infinity. However, a failure to reach a singularity of pressure and temperature is no bad thing. In T-time, the Big Bang happened infinitely long ago.

Second, the time transformation that we made to T-time has no physical motivation. It gives us a convenient time scale for spacing past events, in terms of a familiar function*, but there is no reason to think it will be equally convenient in describing the future.[5]

For example, a value of T = +60.7, which is as far ahead of the present on the T-time scale as the Planck time is behind us, corresponds to a time of 7.5×10^{70} years from now.

Does the long-term future of the

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* Writing these words, I am struck by a slightly depressing thought. Maybe the logarithm is no longer a familiar function. Fifty years ago, every worker in the physical, biological, or social sciences worked with logarithms daily. They had to, or face multitudes of tedious long multiplications. The hand-held calculator has made logarithm tables a thing of the past. Today's necessary tool is a knowledge of computer programming. What will replace that, fifty years from now?

Universe admit such a time? We will see.

3. THE FUTURE OF THE EARTH AND SUN

We will now address our question: when will the Sun stop shining?

A century ago, no one in the world had an acceptable answer. Today we are confident that the Sun shines by the fusion of light elements to form heavier elements, with the small leftover mass difference being converted to energy. (Actually, the fusion of light elements to heavier elements produces energy until we reach the element iron, number 26 in the periodic table. After that, there is a net energy *loss* in creating heavier elements. Any element heavier than iron is produced in supernova explosions, where the necessary energy is readily available.)

We can model mathematically the evolution of the Sun.[6] In the near-term (meaning in this case the next few billion years) the results are unspectacular. The Sun is a remarkably stable object. It will simply go on shining, becoming slowly brighter. Five billion years from now it will be twice its present diameter of a million miles, and twice as bright. Eventually, however, it will begin to deplete its stock of hydrogen. At that point it will not shrink as one might expect, but begin to balloon larger and larger. Eight billion years in the future, the Sun will be two thousand times as bright, and it will have grown so big (diameter, a hundred million miles) that its sphere will fill half our sky. The oceans of Earth will long since have evaporated, and the land surface that is left will be hot enough to melt lead.

In studying the long-term future of the Sun, we have as an incidental dealt with the future of the Earth. It will be incinerated by the bloated Sun, which by that time will be a type of star known as a *red giant.* The Sun, as its energy resources steadily diminish even farther, will eventually blow off its outer layers of gas and shrink to end its life, some ten billion years from now, as a dense *white dwarf* star not much bigger than today's Earth.

Different stars burn up energy at different rates, and that rate depends crucially on a star's size. Massive stars burn up fast, small stars dribble away their energy as radiation in a much more niggardly fashion. Very bright, supergiant stars are visible in the sky today only because they are still being created from great clouds of dust and gas within the galaxies. There is no way that one of the supergiants that astronomers see now could have existed twelve or fifteen billion years ago, near the beginning of the Universe. However, small stars, only one-tenth the size of the Sun, can shine for much more than ten or twenty billion years. Many of the dwarf stars that glow dimly in the sky today could have been shining for the past ten billion years, and may shine for another fifty billion or more.

It might seem, therefore, that there will be a possible home for humanity and intelligence for at least another fifty billion years. It is not clear, however, that such a long period will be available. The long-term future of the whole Universe now comes into question.

* * *

4. THE NATURE OF THE UNIVERSE

The Standard Model of the cosmos begins, as already mentioned, with a vast explosion. The whole of the Universe—space-time itself—then began a great expansion that continues to this day. The speed of mutual recession of any pair of galaxies is generally proportional to their separation from each other.

The central question of cosmology today can be simply stated: Will today's expansion continue indefinitely? Or will it one day slow, and then reverse itself?

The first possibility leads to what is known as an "open" Universe, ever bigger with time and with an infinite future. The second leads to a "closed" Universe, which will end after finite future time with a collapse of everything back into a superheated, superdense fireball like the one in which the Universe started.

Infinite, Open universe, or Big Crunch?

Actually, for theoretical reasons the preference of many astronomers is for something that sits exactly on the fence between those two situations. This third possibility is usually termed a "flat universe," or more accurately, an "asymptotically flat" universe. Such a universe continues to expand but it does so more and more slowly, balanced on a knife-edge between continued expansion and eventual collapse.

It might be thought that the far future character of the Universe is something that is completely unknowable within today's science. Actually, the overall nature of the Universe—open, closed, or flat—is decided by the value of a single number, which in principle we can measure today. That number is the average density of matter in the whole Universe; or, since matter and energy were shown by Einstein at the beginning of this century to be interchangeable, on the average combined mass and energy density of the Universe.

Clearly, we have problems making direct measurements of the amount of matter in distant galaxies; but we can make local estimates, and use those to extrapolate. The situation is made a little complicated because there seems to be a considerable amount of "dark matter," too cold to reveal its presence to us by its emitted energy, and too diffuse to see directly by reflected energy. The principal evidence of its existence is in the way that it affects the general rotation of the galaxies.

Measuring what we can measure, and making other inferences as to the nature and amount of dark matter, the answer seems quite unambiguous: there is not enough matter in the Universe to close it. The value is too small by at least a factor of ten. The expansion must continue forever and we live in an open Universe.

This answer, though apparently definitive, is distressing to many cosmologists. If the Universe is within a factor of ten of having enough matter to close it today, the most popular current theories suggest that it must have been far closer to being closed in the distant past. This leads to the idea that the most likely Universe is a flat one, poised between open and closed. It also raises a question: where is the missing matter?

We will not go into that subject here, beyond commenting that there are two suggested types of matter that might offer enough mass to just close the Universe. They are usually termed "hot dark matter," which consists of large numbers of neutrinos with a small rest mass; and "cold dark matter," consisting of exotic (and still undiscovered) particles known as axions, gravitinos, and photinos. Neither cold dark matter nor hot dark matter seems to provide a Universe with just the right evolution and properties. Almost certainly, something is still wrong with the theory.

5. OPTIONS FOR THE FAR FUTURE

The Big Crunch.

The far future in a closed Universe is currently regarded as the least likely case, so let us deal with it first.

The Big Crunch could happen as "soon" as 50 billion years from now, depending on how much the average mass-energy of the Universe exceeds the critical amount. We know from observation that the mass-energy density is not more than twice the critical density. In that limiting case we will see about 17.5 billion more years of expansion, followed by 32.5 billion years of collapse. A smaller mass-energy density implies a longer future.

Not surprisingly, T-time is inappropriate to describe this future. The logarithm function has a singularity at t = 0, but nowhere else. An appropriate time for the closed universe contains not one singularity ($T = -\infty$, the Big Bang), but two ($T = -\infty$, the Big Bang, and $T = +\infty$, the Big Crunch). As the Universe approaches its end, the events that followed the Big Bang must appear in inverse order. There will come a time when atoms must disappear, when helium splits back to hydrogen, when electron/positron pairs appear, and so on.

A reasonable (but again, we emphasize, non-physical) time transformation for the closed universe is:

$$T_c = \log(t/(C-t))$$

where C is the time, measured from the Big Bang, of the Big Crunch.

TABLE 3 shows how this transformation handles significant times of the past and future. In this case, we have chosen $T_c = 0$ as the midpoint in the evolution of the Universe, equally far from its beginning and its end. For past times, the values are very similar to those obtained with T-time. For future times close to the Big Crunch, T-time and T_c-time are radically different. As the Universe is collapsing to its final singularity T_c-time is rushing on to infinity, but the hands of the T-time clock would be hardly moving.

T_c is a plausible time to describe the evolution of a closed universe. When t tends to zero, T_c tends to minus infinity, and when t tends to C, T_c tends to plus infinity. Thus both end points of the Universe are inaccessible in T_c-time. The transformation is symmetric about the "mid-point" of the Universe, t = C/2. This does not mean, as is sometimes said, that time will "run backwards" as the Universe

TABLE 3

$T_c = \log(t/(C-t))$

Event	*Tc*
Big Bang	$-\infty$
Gravity decouples	−61.31
Inflation of Universe	−52.31
Nuclear matter density	−22.31
Neutrinos decouple	−18.31
Electron/positron pairs vanish	−16.83
Helium forms	−15.95
Atoms form	−4.81
Galaxy formation begins	−1.81
Birth of Solar System	−0.74
Today	−0.52
"Halfway" point (32.5 billion yrs)	0
Helium dissociates	+15.95
Electron/positron pairs form	+16.83
Neutrinos couple	+18.31
Gravity couples	+61.31
End point (65 billion years)	$+\infty$

collapses. Time continues to run forward in either T-time or T_c-time (T_c is a monotonic function of t) from the beginning of the Universe to its end. Note also that T_c has no real values, and hence no meaning, for times before the Big Bang or after the Big Crunch.

Expansion Forever.

Suppose that the Universe is open rather than closed. Then it will expand forever.

Freeman Dyson analyzed this situation in detail in 1979.[7] First, all ordinary stellar activity, even of the latest-formed and smallest suns, will end. That will be somewhat less than a million billion (say, 10^{14}) years in the future. After that it is quiet for a while, because everything will be tied up in stellar left-overs, neutron stars and black holes and cold dwarf stars.

Then the protons in the Universe begin to decay and vanish.

That requires a word of explanation. A generation ago, the proton was thought to be an eternally stable particle, quite unlike its cousin, the unstable free neutron. Then a class of theories came along that said that protons too may be unstable, but with a vastly long lifetime. If these theories are correct, the proton has a finite lifetime of at least 10^{32} years. In this case, as the protons decay all the stars will finally become black holes.

The effect of proton decay is slow. It takes somewhere between 10^{30} and 10^{36} years for the stellar remnants all to become black holes. Note that on this time scale, everything that has happened in the Universe so far is totally negligible, a tick at the very beginning. The ratio of the present age of the Universe to 10^{36} years is like a few nanoseconds compared with the present age of the Universe.

In terms of T-time, the stellar remnants collapse to form black holes between T = 19.8 and T = 25.8. The T-transformation still does pretty well in describing the open Universe.

Long after the protons are all gone, the black holes go, too. Black holes evaporate, according to a theory developed by Stephen Hawking, because they have an effective temperature, and quantum theory allows them to radiate to an environment of lower temperature. Today, the Universe is far too hot for a black hole of stellar mass to be able to lose mass by radiation and particle production. In another 10^{64} years or so (T = 53.8), that will not be true. The ambient temperature of the expanding Universe will have dropped and dropped, and the black holes will evaporate. Those smaller than the Sun in mass will go first, ones larger than the Sun will go later; but eventually all will go.

In this scenario, the Universe, some 10^{80} years from now (T = 69.8), will be an expanding ocean of radiation.

The idea of proton decay is controversial, so we must consider the alternative. Suppose that the proton is *not* an unstable particle. Then we have a rather different (and far longer) future for the Universe of material objects.

All the stars will continue, very slowly, to change their composition to the element with the most nuclear binding energy: iron. They will be doing this after some 10^{1600} years (T = 1,589.8).

Finally (though it is not the end, because there is no end) after somewhere between 10 to the 10^{26} and 10 to the 10^{76} years, a time so long that I can find no analogy to offer a feel for it, our solid iron neutron stars will become black holes. Now our T-time scale also fails us. A T-time of 10 to the 10^{26} years corresponds to T = 10^{26}, itself a number huge beyond visualization.

Is this the end of the road? No. The black holes themselves will disappear, quickly (on these time scales) evaporating to radiation. The whole Universe, as in the previous scenario, becomes at last pure radiation. This all-encompassing bath, feeble and far-diluted, is much too weak to permit the formation of particles. So in our distant future, radiation is all.

TABLES 4, 5 and 6 show the calendar for the future in "normal" T-time, for the closed and open universes with the unstable and stable proton. Time is measured from today, rather than the beginning of the Universe.

6. *LIFE IN THE FAR FUTURE*

There is something a little unsatisfactory about the discussion so far. A universe, closed or open, without anyone to observe it, feels dull and pointless. What are the prospects for observers, human or otherwise? We will not equate "intelligence" with "humanity," since over the time scales that we have encountered, the idea that anything like us will exist is remotely improbable.

TABLE 4

CLOSED UNIVERSE

Event	(billions of years)
Today	0
Sun becomes red giant	5
Halfway point, expansion ceases	17
Most dwarf stars cease to shine	30
Big Crunch	50

TABLE 5

OPEN UNIVERSE, UNSTABLE PROTON

Event	(years)
Today	0
Sun becomes red giant	5 billion
Most dwarf stars cease to shine	30 billion
All stellar activity ceases	10^{14}
Stellar remnants become black holes	10^{30} - 10^{36}
Black holes evaporate	10^{64}
Radiation only	10^{80}

TABLE 6

OPEN UNIVERSE, STABLE PROTON

Event	(years)
Today	0
Sun becomes red giant	5 billion
Most dwarf stars cease to shine	30 billion
All stellar activity ceases	10^{14}
Stars are iron neutron stars	10^{1600}
Neutron stars form black holes	>10 to the 10^{26}
Radiation only	10 to the 10^{76}

Let us note that, on the cosmological scale, life as we know it on Earth has a respectable ancestry. Life emerged quite early in this planet's lifetime, about three and a half billion years ago, so life is about a fourth as old as the Universe itself.

Land life appeared far later, 430 million years in the past for simple plants, while the first land animals came along a few tens of millions of years later. Mammals have existed for maybe 225 million years, and flowering plants about a hundred million. Recognizable humans, with human intelligence, appeared a mere three or four million years ago. We are certainly upstarts, in a Universe where ordinary turtles have been around, essentially unchanged in form and function, for a couple of hundred million years. Perhaps that is why we lack the calm certainty of the tortoise.

Humans have a short past, but we could have a long future. For starters, the Earth should remain habitable (unless we ourselves do something awful to it) for a few billion years. But in five billion years or so, the Sun will slowly begin to swell until it is at last a hundred times its present size. Earth will be a charred cinder. Where will our descendants go?

We have already answered that question. Dwarf stars can shine for at least another thirty billion years. They shine dimly, but a planet or free-space colony in orbit a few million miles away from one will find more than enough energy to support a thriving civilization; and of all the stars in the Universe, the inconspicuous, long-lived dwarf stars appear to form the vast majority.

We are safe, not only as intelligence but even as humans, for at least another twenty billion years. The Earth, however, will be gone forever—unless perhaps our descendants, displaying a technology as far beyond ours as we are beyond the Stone Age, decide to take the whole Earth along with them on their travels for sentimental reasons.

If we are to consider longer time scales, beyond thirty billion years, we must distinguish between the cases of an open and a closed universe.

In the universe of the Big Crunch it seems obvious that life and intelligence cannot go on forever, since the future contains a definite time at which everything in existence will be compressed to a single point of infinite pressure and temperature. Life certainly cannot survive the Big Crunch, thus if we continue to measure time in the usual way, life exists for a finite time only. However, we have already noted that in T_c-time, even the Big Crunch is infinitely far away. Although the transformation that we introduced seemed like a mere mathematical artifice, it can be shown that there is enough time (and available energy) between now and the Big Crunch to think an infinite number of thoughts.[8] From that point of view, if we work with *subjective* time in which life survives long enough to enjoy infinite numbers of thoughts, that will be like living "forever" according to one reasonable definition. It is all a question of redefining our time coordinates.

The open universe case has no problem with available time, but it does have a problem with available energy. In the far future our energy sources will become increasingly diluted and distant.

Dyson has recently analyzed this situation.[9] He has looked at the possibility of continued life and intelligence for the case of an asymptotically flat spacetime, where the Universe sits exactly on the boundary of the open and closed cases. I have not seen the details of his analysis, and to my knowledge they have not been published. Here, however, are his conclusions.

First, hibernation will be increasingly necessary. The fraction of time during which a thinking entity can remain "conscious" must become less, like $t^{-1/3}$. Also, the thinking rate must decrease, so that "subjective time" will proceed more slowly, like $t^{-1/3}$ To give an example of what this implies, one million billion years from now you will be able to remain awake for only ten years out of each million. And during those ten years, you will only be able to do as much thinking as you can do now in one hour. The good news is that you have an indefinitely long time available, so that you can eventually think an infinitely large number of thoughts.

Curiously enough, in an ultimately flat universe an infinite number of thoughts can be thought with the use of only a finite amount of energy. That's just as well, because in such a universe energy becomes less and less easy to come by as time goes on.

What will the entity be like that thinks those thoughts in the far future? Could it be even remotely human? I think not, but I prefer to leave the matter open. I leave it to the reader to decide what life and intelligence might be like, say, 10 to the 10^{20} years in the future. Remember, the progression from bacterium to the 104th Congress (if that is fairly described as progress) took place in a mere 3.5 billion years.

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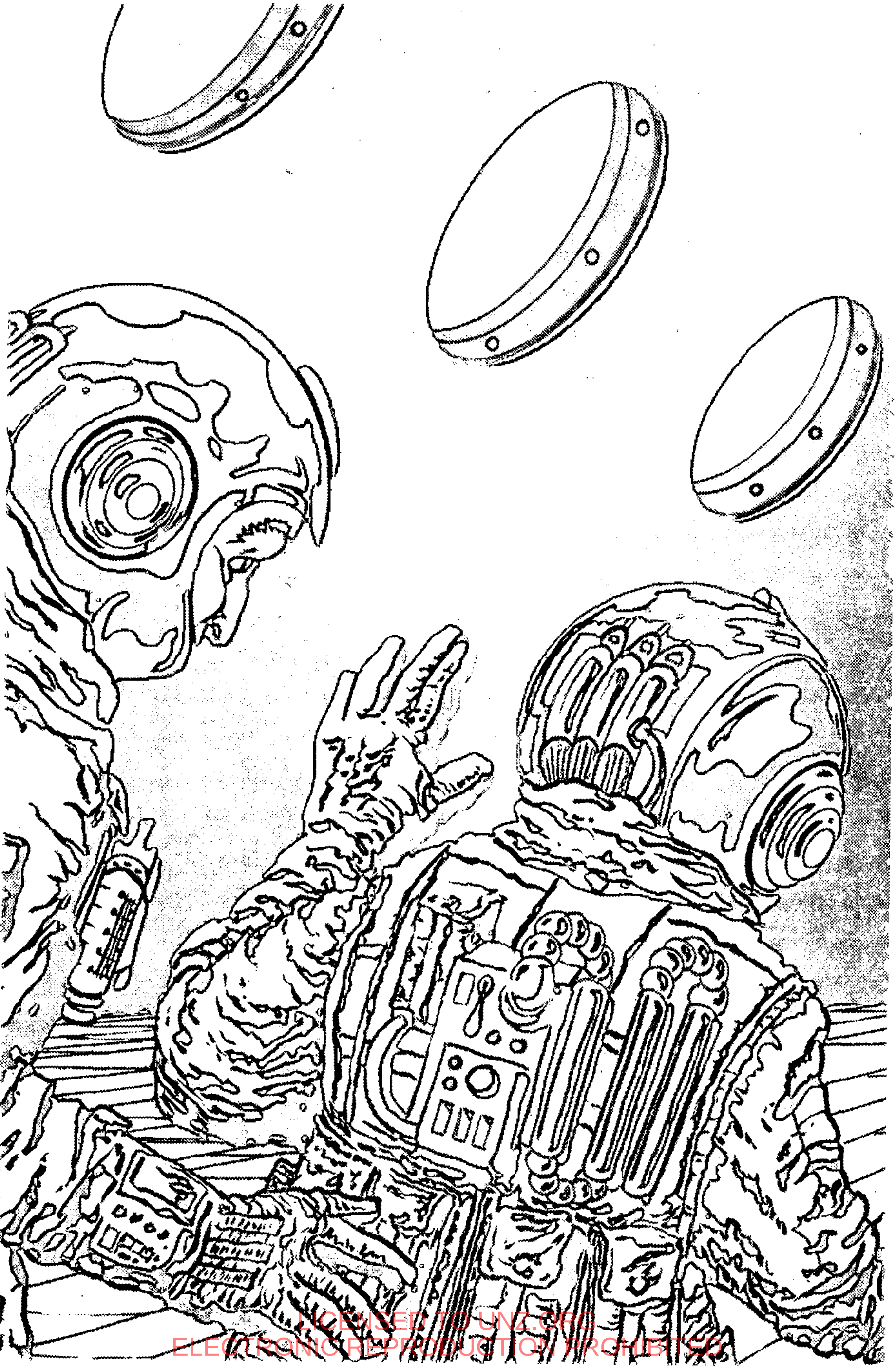
9. Freeman Dyson, private communications, 1992-3. I am not sure if *private* communication is the right term, since some of these results came to me on a postcard. The postman could have read them. Maybe "personal communication" is better. ■

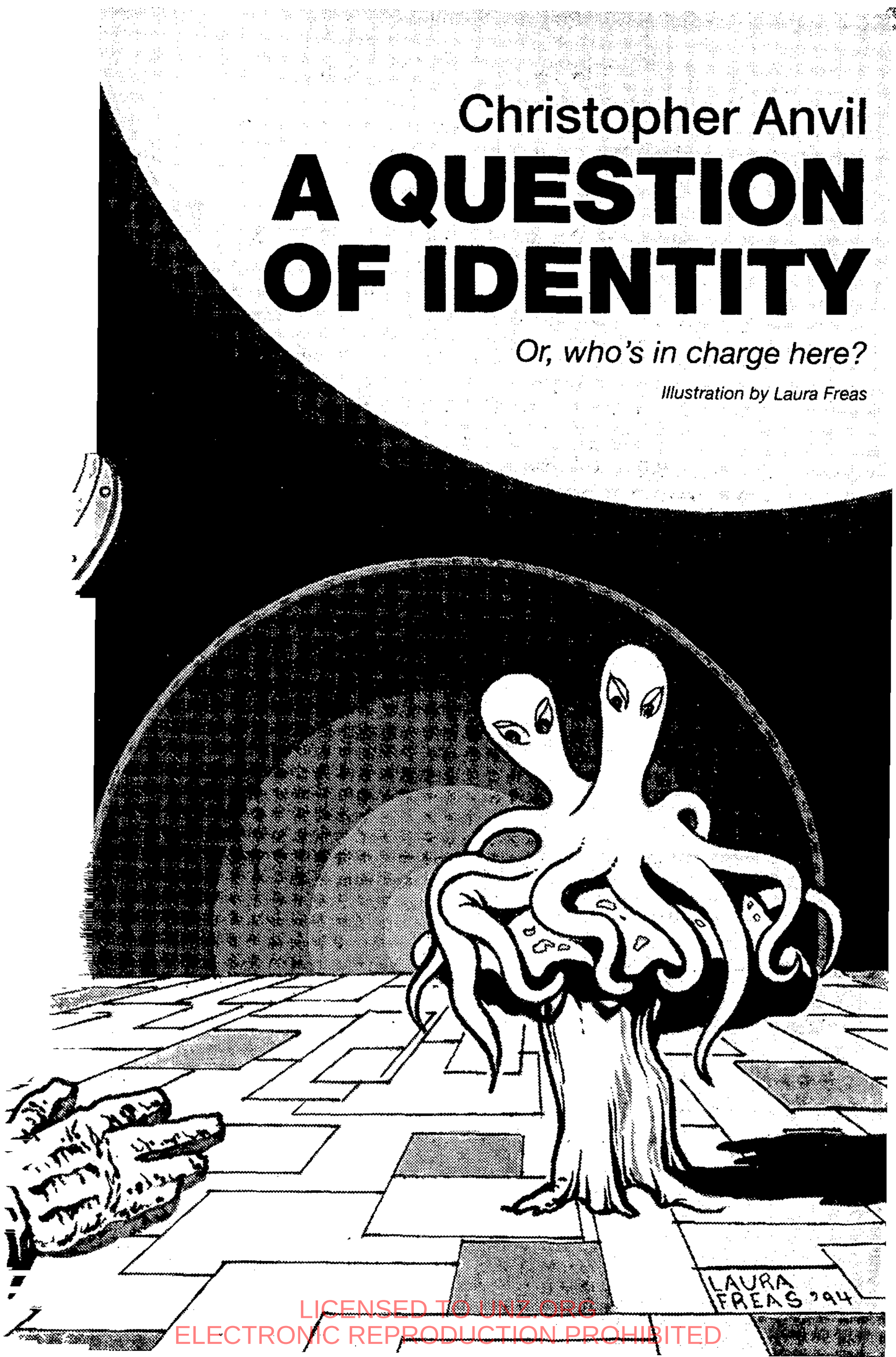


Christopher Anvil

A QUESTION OF IDENTITY

Or, who's in charge here?

Illustration by Laura Freas


LAURA FREAS '94

Ed Cassetti stood before the pair of big viewscreens in the on-call cabin of the contact-ship *Ambassador*. The left-hand screen showed a small and shrinking image of the planet Earth. The right-hand screen showed a vague skull-like shape that loomed larger as Earth dwindled.

To Cassetti's left, Sam Richards, the other human on the computer-controlled ship, glanced at a warning light by a small grille between the screens. This warning light glowed red, and the grille emitted an artificial voice: "Contact Specialist 4 Samuel Richards: You will immediately correct nonstandard contact-suit-liner configuration."

Richards sighed, and put the hood of his khaki skisuit-like uniform back over his head.

The light faded out.

Cassetti murmured, "More coming."

"Naturally. But the damned hood gets hot."

The red light came back on.

"Contact Specialist 4 Samuel Richards: You have committed Uniform Violation Level Three. You will immediately do forty push-ups."

Richards dropped to the deck. Keeping his back rigid and straightening his arms fully, he methodically did forty push-ups.

The red light stayed on.

"Contact Specialist 4 Samuel Richards: You will repeat aloud the first three Rules For Human Contact Specialists."

Richards, his face expressionless, stood at attention.

"Contact Rule One: 'At the earliest possible moment, transmit all relevant factual information to Computer Data Control. Rapid data transmittal is as important now as during the Accident.'

"Contact Rule Two: 'Do not attempt to judge an extraterrestrial race or its artifacts on the basis of human experience. This is the first contact with an extraterrestrial race, and human experience is irrelevant.'

"Contact Rule Three: 'During contact, do not attempt to draw independent conclusions. Human data-storage capacity and calculating ability are minimal. Prompt responses, based on complete data recognition and rapid processing, are vital. Computer control is therefore essential.' "

The artificial voice said, "That is correct. You are warned to obey instructions promptly and exactly."

The light faded out.

Richards exhaled. "Talk about 'user unfriendly.' "

Cassetti said, "Before the Accident, that used to be known as 'Master Computer 3C, humanity's kindly guide, companion, and servant.' "

"So I remember. Did a few circuits burn out?"

"I think they reprogrammed it to give orders right after the Accident, because there was no other way fast enough—and then it just drew the natural conclusion as to who's boss."

"Why *that* interface? It would have been easy to give it a bearable voice, for a start. And this barking of orders gets wearisome."

"It sure does. I suppose they were in a hurry." Cassetti glanced around at the screen. "Look at this."

On the right-hand screen, the pale looming shape had become more solid, and a legend appeared:

EXTRATERRESTRIAL SHIP
ENHANCED IMAGE
ACTUAL SURFACE HIGHLY REFLECTIVE

The vague skull resolved itself into five spheres, four at the corners of a tetrahedron with its apex down, and another at the center, each joined to the others by straight cylinders. A small sixth sphere was connected only to the center sphere.

Richards tapped the edge of the screen, and a tiny oblong appeared, showing their own ship to the same scale.

Startled, he glanced at the tetrahedron. "That thing is huge."

"It sure is. Now, look."

As the legend, "ENHANCED IMAGE," flashed repeatedly, a web of glittering braces appeared, reinforcing the extraterrestrial ship.

Cassetti said. "Apparently those are so shiny as to not even be visible without enhancing the image. I wonder what that ship looks like naturally?"

"A blur or distortion in the star field? That would be my guess."

"It would be interesting to just shut off the enhancement and see."

Richards glanced around the frame of the screen, as if for controls that weren't there. He shook his head. "Have to ask MC3C for permission."

"No, thanks. Last time, we got one hell of a lecture."

"Being a computer's helper gets tiresome. It's like being apprenticed to a bloodhound, and judged accordingly."

"Yes. In the computer's specialty, we're imbeciles. The devil with the screen."

"That web of braces does tell us something, though."

"That the extraterrestrial ship goes through heavy stress?"

"Or that the extraterrestrials believe in a good margin of safety."

"H'm. Yes."

Just below the lowest of the spheres, a faint ghostly form filled in to become a corrugated curving cylinder joining their ship and the extraterrestrial. From somewhere forward came a clang and a sound of pumps.

Richards murmured, "We're connected."

Cassetti shook his head. "Damn it. The computer must be going to use its own mobile communicator to make the contact."

"Looks like it. If we were going, we'd have had to suit up by now."

Cassetti pictured the beachball-size communicator with its cable, and shook his head. "With that thing, the master computer can be directly connected, and run the whole show. We're surplus baggage. Fido's going to catch the rabbits on its own."

Richards studied the monster ship on the screen. He said drily, "I sure hope Fido understands what it's up against."

"If it wasn't going to use us, why train us and bring us along?"

Richards turned away from the screen, and sat down in one of several massive heavily padded seats. "My guess is, some subprogram in its operating system demands backup, just in case. We're backup."

Cassetti exhaled harshly, and sat down in another seat. "What does backup do? Play cards? Shoot craps?"

Richards shrugged. "Not ours to reason why. Who knows? It might decide to use us yet."

"Generous of the s.o.b."

In the far lower corner of the right-hand screen, rapidly changing figures were now reeling off minutes, seconds, and decimal fractions of a second, apparently since the ships had joined.

As the figures spun around, Richards and Cassetti discussed what they thought of MC3C, and other computers they had known. They rehashed details of the nightmare that had followed the Accident and preceded this job. Cassetti damned employers who cut their research departments, thereby leaving him unemployed. Richards got started on his theory of the inevitability of a technological Accident, a theory so unpopular before the actual Accident as to have landed him in his department chairman's version of a dungeon.

There was a metallic smashing noise as Richards was saying, "The trouble was, they didn't have the details of the Fulmar Drive worked out yet, but everybody could see how to make a fortune if the units could be linked to make a gravitic corridor from the Belt inward. So—"

Cassetti glanced around. "What was that noise?"

"I don't know. It sounded fairly close."

From somewhere came a peculiar high-pitched whistle; it ran up and down the scale, as if the player of an instrument were trying to find the right note; but apparently the player couldn't find it, and the whistle faded out.

Cassetti looked exasperatedly at the screen, which showed nothing new. "What the devil is going on now?"

Richards became aware of a kind of rumble that was only barely audible, as much felt as heard. This vibration faded away, then came back as a kind of fast-climbing high-pitched squabbling noise.

Cassetti got up. "Damn it! We've been trained. We aren't as dumb as the computer claims!"

Richards settled back. "Take it easy. If MC3C is doing the kind of job I think it's doing, we may get a chance yet."

Cassetti glanced at the screen, which still showed only the outside of the gigantic extraterrestrial ship. Richards waited patiently.

For a few moments the background was almost silent, then there was a heavy thud, followed by whistles, rumbles, clangs, and unclassifiable sounds that faded abruptly in and out, all now remote and muffled.

Cassetti tried the hatch to the corridor. The hatch didn't budge.

Richards said, "Surely you have confidence in our wise and genial boss?"

Cassetti spat out a bad word.

The deck jumped.

Between the screens, the red light flashed on. There was a crackle, and suddenly a familiar voice: "Subparagraph 7.1 of your Employment Contract requires 'prompt externalization of relevant personnel should Computer-Extraterrestrial contact prove counterproductive.' To signify compliance, you must immediately take one step forward."

They instantly stepped forward. There was trundling noise, and a pair of what looked like exceptionally bulky spacesuits came in dangling from overhead trolleys.

Richards and Cassetti, who had drilled till the routine was second nature, helped each other into the bulky suits, then stepped into a brightly lit testing chamber with mirrored walls, hand-grips, foot rests, and pressure controls; they ran the air pressure warily up and down to check the suit seals, studied the suits in the multiple reflectors, and carefully went through a voice checklist.

Cassetti said, "Done?"

"With the *easy* checks."

"Right."

Now they tested the controls inside the suits' big outer helmets. Placed inside to avoid possible interference from aliens whose customs might involve unpredictable personal contact, the controls were spaced to either side of the outer faceplate, lit by faint miniature lights, and worked by an outthrust projection on the inner helmet, which moved the specially shaped and color-coded switch-handles of light plastic. Only a slight pressure was needed to control the faceplate wipers and the other odds and ends, as well as the "unlimited," "timed," and "end-controlled" jets for maneuvering in low gravity.

Cassetti experimentally moved his head to check the lens that slid down over the faceplate of the inner helmet to bring the switches into focus, then slid up as he faced forward to look through the outer faceplate.

Each time, this lens gave a squeak, and then a little catch before it slid back up again. There was also what looked like a set of flyspecks somewhere on the multiple supposedly transparent surfaces; this blur stayed in his field of vision even when he used the wipers.

Richards growled, "What happens if this lens gets stuck in the wrong position?"

"MC3C says it's impossible."

"This one hesitates, and it squeaks."

"So does mine."

A tone inside the helmets now gave notice that the suits' communicators were receiving a signal from the computer.

Cassetti said, "Contact Team Commander to Computer Data Control. Ready to begin contact."

"Computer Data Control to Contact Team Commander. You will immediately leave the on-call compartment, and enter the space-corridor airlock."

They stepped clumsily through the hatchway, leaving the two big screens behind them, and walked along a narrow corridor, the suits awkward and ungainly, but gradually becoming more familiar and predictable. Then they eased through the narrow hatchway of the compartment next to the airlock, crossed the compartment to step over the lock's wide sill, and, behind them, the hatch went shut. The hatch in front slowly opened, and they went out into a kind of antechamber where they were still in the ship, but in front of them was a shiny flexible corrugated cylinder suggestive of the inside of a giant metal snake.

Cassetti turned slowly, adjusting his suit's external mirrors. In a corner between a massive bulkhead and the exterior hull, there came into view a pile made up of cable chopped into short lengths. Nearby was a chunk of crushed metal and broken plastic the size of a beach ball, with wheels and metal arms bent, wheel-tracks dismounted, and the grille of a speaker torn loose and hanging by one corner.

Cassetti gave a low fervent oath. "There's MC3C's Mobile Communicator."

Richards grunted. "Contact was 'counterproductive,' all right. Well, now we get to earn our money."

They turned toward the corridor, and Cassetti said, "Watch it—no artificial gravity here."

As they cautiously nudged controls in the helmets, short-lived bursts from the shoulder jets lifted them, and, moving almost horizontally, they passed through the first part of a long continuous bend, drifted toward the flickering corrugated face of the corridor, moved away with wary use of the jets, swung further around the continued bend, and now the suits' external mirrors showed ahead of them a fast enlarging hatchway into a lighted chamber.

Richards said, "We'd better slow down, or we'll be in there before we know it."

With a shock, Cassetti realized he had fallen into a daze watching the flickering corridor wall. He nudged the controls, and swung further toward the center of the corridor, to be vertical to what looked like the deck ahead on the far side of the hatchway.

Richards said, "Still too fast."

"Right. Damn it."

They slowed further, and approached the airlock still decelerating, their feet swinging out ahead of them.

Abruptly, something slammed them sideways. There was a shock, a crash, and a roar.

Cassetti's lower lip hurt, his ears rang, and somewhere there was a voice nearly drowned out by the roar. On the far side of the outer faceplate, there was a blur. It dawned on him that his idea of "vertical" must have been ninety degrees off. He had floated, to all practical purposes sidewise and horizontal, into the airlock while in effect trying to land on a wall—then when he slammed to the deck, he must have banged one of the helmet's switches.

Richards shouted, "Ed! Controls!"

The lens plate, which should have slid down to make it easy to focus on the controls a few inches away, now hung up, so the color-coded stalks with their little glowing lights blended into a jolting frame with a Christmas-like effect around the chaos in the faceplate. Somewhere, again, there was a voice. Cassetti realized he must have bumped one of the 'unlimited' switches, so there wasn't just a timed burst, but a blast that wouldn't end until he found the switch or ran out of propellant. In trying to tap the right stalk at the wrong instant, he now got another one instead.

He yelled, "Grab hold!"

"What do you think I'm—Look out!"

For an instant after they hit the wall of the airlock, everything was still, and he managed to get one switch off. They reeled through three or four wild circles, slammed a wall again, and he managed to get the other switch. Then again they were going around in circles, and it dawned on him that Sam Richards must have hit one. Again a voice roared out amid the bangs and crashes. Then again they smashed to a stop in a heap in a corner, and after an instant's silence Richards snarled, "Who in hell designed these suits?"

"Are you serious? Who do you think?"

A new voice spoke slowly and distinctly:

"Is this an argualage of the planetere computer?"

Cautiously, they got to their feet.

The voice spoke again, its words faulty but very clear:

"Is this a assaglage of the plammeddare calculator?"

Cassetti checked to be sure the suit's external speaker was off. Richards's voice spoke in his earphones: "Sounds a little mixed up. But according to the computer's cram course for making contact, the other side may estimate our capabilities by making calculated errors, and seeing if we understand anyway. Whereupon we can do the same."

"Sounds like a great way to turn a misunderstanding into a war. I'll assume it's a straight question." Cassetti snapped on the suit speaker.

"We are not an assemblage of the planetary computer."

"Are you calculators?"

"We are humans, not computers or calculators."

The outer airlock doors swung shut.

Cassetti snapped off the external speaker and waited. There was no further comment.

Richards went to the closed airlock door and tried without success to move it. "We're locked in."

"Better than being booted down the corridor in pieces."

"You know, that's a fluent alien."

"Well, according to that same course, one of the first steps in an extraterrestrial contact is supposed to be to match files of pictures, drawings, transparencies, and models of various objects, and exchange whatever symbols, including spoken words, represent the corresponding objects. That should make for lots of fluency."

"Did you notice how fast that hatch went shut when you said we weren't computers?"

"I did."

"Something," said Richards, "suggests to me this alien is tricky."

"We may be about to find out. The inner hatch is opening."

In front of them, a section of wall rotated, then swung slowly aside.

They waited tensely for someone or something to come through.

Nothing happened.

"I guess," said Richards finally, "it

wants us to make the next move."

"Go in through the hatch?"

"What else?"

"Very reasonable. Let's just remember what happened to the Mobile Communicator when we go in there."

They turned carefully in various directions, using the suits' external mirrors to be sure they were still alone, then approached the low sill in front of them. This turned out to have on the far side a kind of thin tightly woven veil of shiny interlinked circlets that lit up in their helmet lights, and hid any view of whatever might be in the darkened room beyond.

"Nice," said Richards. "Maybe what happened to the communicator was, it just went in there."

"Maybe. I'd more credit the computer's natural charm after it went in."

Cassetti got a grip on a handful of the slippery interlinked veil, and dragged it out the opening. Richards held it up while Cassetti carefully eased over the sill. Then he held it as Richards came in. Once there, they passed it over their heads, peered around, then again snapped on the suit lights.

Cassetti said, "Still can't see a thing."

"There's another veil or curtain—looks like this one is made of some kind of black cloth."

"Let's ease around to the left."

"What's the point of hiding things from us?"

"Offhand, I'd think the idea is to surprise us with whatever's on the other side of that curtain. But not to surprise us while we were still outside the hatch looking in."

"Get us in here first?"

"Exactly. Then lock the hatch so we can't get out. *Then* spring it on us. Test our reactions."

Richards said, "I always did think they should mount a few guns on these suits."

"Yeah. Be nice when we bumped the wrong control."

"Everything has its disadvantages. That curtain is lighting up."

Beyond the curtain, there was a glow, that strengthened into a bright light that shone through the fabric of the curtain. The curtain began to slide to the side. A quick check revealed the circular hatch rotating into position, to lock them in.

Richards growled, "These extraterrestrials seem to think the same way we do. They're following your program."

"In that case, be ready to move. This may be where the communicator got it."

Abruptly the curtain was gone.

Before them sat what looked like a pale-pink two-headed octopus upright on a giant toadstool. Close beside it stood a figure apparently made of sections of shiny green bamboo of various thicknesses, with what appeared to be a glaring eye on each end of a T-shaped bamboo bar that seemed to serve as its head.

Both of these figures were perfectly motionless.

Richards recovered while Cassetti was still groping mentally through a maze of indoctrination to the effect that appearance did not count, and that whatever an alien might look like, the limitations of human experience rendered suspect any judgment based on appearance. There was a faint click, then Richards spoke evenly.

"How are you?"

He got no reply, and tried again: "We greet you."

That brought no response, either.

Cassetti cleared his throat. Supposedly, the exchange of images and vocabularies had already taken place. He snapped on his external speaker.

"Hello."

They waited.

Nothing happened.

They both shut off their external speakers.

After watching the motionless scene for about three minutes, Richards growled, "That octopus looks to me as if it's made out of translucent plastic."

"It does, at that."

They stood there for another minute or so.

Nothing moved.

Cassetti said, "Do you get the impression of a little joke at our expense?"

"I'm still half-paralyzed for fear we'll step on the extraterrestrials' taboos and create a disaster. But I begin to wonder if maybe we're up against some entity that doesn't go by the book."

"At least not by the computer's book."

"Right."

"I've been trying to contact MC3C, and haven't gotten a response since we came in here."

"Naturally. How would it get a signal into this place? And do we want instructions so we end up the same way its communicator ended up?"

"I want to be sure we're on our own."

Richards said, "As far as I can tell, we're on our own."

"Then I'm going to try something."

"Hold it. The bamboo horror just moved a couple inches."

Cassetti turned his mirror. "It's not moving now."

"It *did* move."

They both stood frozen, and time stretched out. Cassetti snapped on the suit speaker.

"Hello."

Nothing happened.

He shut off the speaker, and moved cautiously toward the imitation-looking octopus. The closer he got, the more fake it looked. He eased closer, and closer, and—

Pop!

Both heads of the octopus separated from the body in front, and swung neatly back. Out of the stubs of the necks protruded two bunches of what looked like purple-and-yellow flowers.

There was a silence that lengthened out while Cassetti listened to a distant *thump-thump* that he supposed was blood being pumped through his ears.

Richards's voice came across as a distant murmur.

"Do you suppose at some point the computer came up against this?"

In his mind's eye, Cassetti could see the computer's beach-ball sized communicator with all its receptors focused on this imitation alien with bouquets of flowers sticking out its necks. What would the computer do? All its complex processors, its lightning-fast memory, its high-speed cache, its bank of situation models, its Rapidaptive Master Operating System with clear and fuzzy subsystems, all its programs instantaneously on tap—all were set to swiftly process the relevant facts and relationships. So—

Just exactly which facts were relevant here?

Was anything related to anything else?

What was the problem?

Richards said, "It's too bad we don't know what it did, so we could do something else."

"Do you suppose the communicator alone was up against this? Or did the alien leave the airlock open for the Master Computer itself to be connected?"

"From the racket we heard, it seemed to me that at first the two ships were open to each other. I'd say it was open on our ship at least as far as the hatch off the corridor to the airlock."

If, Cassetti told himself, there had been no provision for a connection, the communicator would have lacked contact with the rest of the computer's circuits. But the communicator was supposed to be provided with a large built-in memory, sophisticated programs in ROM for contacting extraterrestrials, and a calculating ability supposedly capable of making any ordinary human look foolish. Besides, where had all that chopped-up cable come from? It must have been connected. But either way, it hadn't done much good.

Richards spoke sharply.

"Watch it! The bamboo thing just moved again! You want me over there?"

"Better stay where you are. If we're both watching the same thing, something else could come loose."

As Cassetti studied it, the thing that looked tacked together out of odds and ends of bamboo remained still.

The imitation octopus stayed motionless with the flowers sticking out its imitation necks, with both its imitation heads tilted back.

Cassetti exhaled sharply. Whatever mistakes the computer may have made, and whatever instructions it had given, he and Richards would have to act for themselves. His mind hopefully free of most of the computer's indoctrination, he stepped carefully forward, tugged on the flowers, and they lifted into his hands. A passage from the *Extraterrestrial-Contact Training Manual* now repeated itself in his head:

"You will at all times avoid physical contact with extraterrestrials or their artifacts except in situations in which physical contact is clearly indicated."

In this situation, nothing seemed clearly indicated.

He adjusted an external mirror, looked down the holes the flowers had come out of into the hollow interior of something with translucent curving walls, then got a grip on one of the flexible arms.

The imitation tentacles, it developed, bent smoothly and easily under pressure. After twining the end of one of them over the creature's shoulder, the flowers fit in a loop of tentacle, to look like a bouquet. Another of the monster's tentacles, around in front, pushed over a third, gave the effect of one leg crossed over another. The heads latched neatly when clapped shut. He stepped back to take a look.

There sat a pink two-headed octopus cross-legged on an oversize toadstool holding an armful of purple-and-yellow flowers, as its bamboo-monster friend looked on with an evil gaze.

Richards laughed. "One insanity deserves another."

"I may be wrong, but something tells me the alien in control of this scene is not of a strictly logical nature."

There was the sharply varied blast of a whistle. They looked around.

As the last tones died away, the bamboo thing sluggishly began to move. Unfolding an arm with several joints, it brought up a kind of spike-studded metal bar, swung it up overhead, wheeled it leisurely around in a wide arc, made a slight adjustment in aim, and then brought this deadly looking thing down toward Cassetti's head.

The creature's intent seemed clear from the vicious light in the eyes at the end of its T-shaped stalk, but as it was moving with the speed of a hurried snail, it was no problem to get out from underneath as this spike-studded club traveled down, hit the deck, bounced, and then the creature braced itself, got the club up again, and took another swipe, bringing it around horizontally this time.

Cassetti stepped out of the way, got out the thin flexible line fitted into a compartment on the right leg of his suit, and that they had practiced with almost to exhaustion, and with Richards's help tied this bamboo creature, minus its club, to the overgrown toadstool.

Richards turned slowly around, to check whether they were alone, and his voice sounded doubtful. "If it weren't for what these aliens did to the computer, I'd think they weren't too bright."

"I'm not so sure. That business with the imitation octopus gave us no reasonable precedent at all. Next, this bamboo thing and its club pitted two sensible rules against each other: don't hurt the alien; don't get hurt yourself. Then there are the extra complications that the bamboo thing obviously meant harm, was too slow to do it if you used your head, but was still too dangerous to ignore. And neither of these problems was what you'd expect to run into in contacting an extraterrestrial."

"But what's the idea? What is it we're up against? Is the bamboo cretin the extraterrestrial? And what, if anything, is this hollow octopus? Not to mention the damned flowers and the toadstool."

"I don't know. But—"

There was another varying whistle, then a clank from the direction of the bamboo creature they had just tied up.

They turned, to see it heave against the cord, whirl, thrash, move in a blur to the end of the cord—then streak to a stop in the opposite direction as the cord strained and the toadstool shook. Considering the way it was moving, if it ever got loose—

Richards grabbed up the spike-studded club, evaded a lightning-fast swipe, brought the club down hard, and smashed the creature's legs.

Abruptly it lay still.

Richards stepped back, holding the club.

Because of faceplate reflections, Cassetti couldn't see Richards's expression, but he could hear the scowl:

"When it's free, it has the speed of a caterpillar. Once it's tied up, it goes so fast you can hardly see it. If this thing had moved like that earlier, one of us would have wound up in pieces on the end of its club."

"Either it has a peculiar metabolism or that was another test."

"Did we pass it?"

"We're alive."

"Right. Thinking of the communicator—"

There was a faint click.

They glanced around, which involved changing their positions in order to aim the faceplates roughly where they wanted to look, then swiveled the mirrors—but there was nothing in sight they hadn't expected to see.

Behind them, the heavy inner airlock door was solidly shut. The side walls looked blank. In front was a bulkhead with another hatch. The hatch looked shut.

What made the click?

Just then Cassetti noticed a dull glint of reflected light from something on the deck near the right-hand wall.

He stepped over, and there lay a curving piece of shiny metal with a broken chunk of dull-grey material attached to it. Along the broken surface, this material appeared to be very finely and elaborately patterned.

Richards said, "Part of the memory bank of the communicator?"

"That would be my guess."

"Suggests we're in the same place where it got beat up."

"Where it got, for all intents and purposes, killed."

"This didn't make that click, did it?"

"I don't see how. It sounded like a latch."

Just then, there was the faintest, barely detectable, creaking sound. They looked around.

In the wall toward the interior of the alien ship, the hatch slowly swung open.

Through the hatchway stepped a creature roughly like a cross between a man and an ostrich, with deep green and scarlet plumes, a long slender neck, a large-skulled head with a face like a forty-year-old spoiled brat equipped with a hawk's beak, small dainty arms where wings might have been expected, and legs ending in large birdlike claws. Both of its lower legs were fitted with glittering knifelike spurs whose points aimed to the rear.

Richards said drily, "I liked the bamboo thing better."

"Watch out for those spurs."

The creature came toward them sidewise, delicate arms slightly lowered, fists clenched, spurs flashing, its head turned so that it didn't face them, but looked at them sidewise out of the corners of its eyes.

Richards and Cassetti separated.

It skipped sidewise fast, to dart between them. As it passed the edge of Cassetti's faceplate, he could see it raise one leg, to bring the nearest spur up like a dagger.

Across the room, another one was starting out of the hatch.

Cassetti dropped to a crouch facing the hatch. There was a screech, and the spoiled-brat face reappeared, going backwards past the edge of his faceplate, flattened up against the grayish chunk that Richards had just slung at it.

Cassetti hit the "Max Lift Burst" switch, there was a roar, he was rammed down in the suit, and smashed into something soft, just coming in through the hatch. A knife flashed past in front of his faceplate, closely spaced red hate-filled eyes briefly glared directly into his, and then he got both of the suit's gauntlets around the thin feathery neck, and bashed the creature's head against the wall. One of the suit's mirrors showed him a view of the hatch, with beaked heads crowded behind it, and he let go of the bony neck with one hand, slammed the hatch closed, and shoved down the locking handle. The handle promptly snapped up again, and he shoved it down. After a slight delay, it went up again, and again he shoved it down. This time, he noticed the flimsy catch near the handle, and locked it in place.

Just then, there was a flash, and a knifelike spur hit the edge of his helmet next to the faceplate. At almost the same moment, he got a view of the vicious gratified look on the face of this man-bird that apparently figured he had got in a solid painful blow with his spur.

Cassetti let go the door latch, seized the bird and swung it, using the thin feathery neck for a handle, and it went up and around, and came down with a gratifying smash on the deck, so Cassetti tried it again, but now it was harder; this time, the creature was limp. The second time it hit the deck, he came down hard on its chest with both heels.

Across the room, Richards was standing over the other one, feathers stuck all over the business end of the bamboo creature's club. He straightened up slowly.

"I wonder if these things could be the extraterrestrials?"

"Look at their hands."

"They could use tools, all right. Well—something tells me we aren't going to get along too well."

Before they had any chance to think over this proposition, or what it might mean in terms of their longevity, there was a mournful sob from somewhere. This cry was taken up by what sounded like flutes, guitars, washboards, steel ball bearings rolling down drainpipes, and then a regular orchestra joined in in the background to create a mournful wailing that was repeated over and over again.

Richards picked feathers off the end of his club.

"Do you get the impression that we've just committed sacrilege? I mean, these things come in here to stick us with their fourteen-inch spurs, and that doesn't bother anyone. Then we brain a couple of them, and this noise starts up."

"Look at that airlock."

Across the room, the big airlock door was rotating and now swung open. On the other side, there was a peculiar effect, as of a sudden magical appearance. One instant, there was nothing there. The next instant, a human-looking figure naked from the waist up seemed to spring into existence just outside the hatch. It stood there, arms at its sides.

"You have killed."

Richards got the last feather off the club and started for the airlock.

The background music wailed. The figure opened its mouth again. "You have killed a living being!"

The figure slowly raised its arms sidewise. When the arms were about a third of the way up, it intoned, "The blood of life is on your hands!"

Richards had started to raise the club, but now lowered it. His voice growled in Cassetti's earphones: "This thing looks real. The voice sounds real. But they don't mesh."

"That business of raising its arms sidewise doesn't fit much of anything, either. And there's something else."

"What?"

"It didn't step in front of the hatch. It *appeared* there. I wonder if this figure could have come from some scene shown by the computer, and recorded by the aliens? And now they play it back at us?"

"If so, no wonder they mangled the communicator."

While they were trying to work this out, the figure didn't stay still. Its hands climbed till they were extended straight overhead, and the voice bellowed, "On your knees! Killers! Murderers!" The arms started down again. "Cast down your weapons!"

Richards said, "Maybe the computer tried this after it lost a chunk of its memory?"

"Or possibly the idea of this is to see how nice our disposition is?"

"Not that nice." Richards stepped forward, and thrust the end of the club at the center of the figure's chest.

There was a crash like breaking glass. For an instant, Cassetti seemed to see the figure through one eye, and to see empty space through the other eye. Then it was gone. At the same instant, the music ended.

Richards stepped forward to take a look on the far side. The airlock door promptly swung around.

Richards turned. "What's our score so far?"

Cassetti glanced at the bamboo thing, cowering by its octopus buddy on the toadstool, the apparent piece of the communicator's memory bank, and the pair of man-birds flat on the deck with their glittering knifelike spurs.

"Just passing, I'd think. We still don't know what's going on. On the other hand, we're still alive."

"Still ahead of the computer."

"All considered, that's not hard. Incidentally, I see your point about guns in the suits. I envy you that club." Looking at the pair of man-birds, it occurred to Cassetti that there were possibly useful weapons in the form of those spurs. True, they didn't seem to offer much of anything in the line of a usable grip. But still—

Before there was time to work anything out, there was a loud snap, a slam and a crash of metal on metal, and Richards shouted, "Watch it! The hatch again!"

Cassetti turned, to see a thing resembling a black bear wearing a blue uniform, with a wide skull and partly human face, vault in past the sprung hatch carrying in its right hand a short sword or long knife. Close behind it came another holding a short-barreled gun in both hands. Right behind that came a third and a fourth carrying the same kind of gun. They poured in through the hatchway like water through a floodgate. They and the cohort that came in behind them didn't aim their guns, but lined up in two files as the leader with the short sword gestured toward the interior of the ship.

Richards and Cassetti saw no gain in trying to fight this crew, and let themselves be hustled out into a long corridor. They were marched fast down the corridor into a huge room occupied by non-humans twelve to forty deep on either side of the door, and facing each other across an aisle that stretched to a raised platform on which was a long table with more nonhumans seated behind it, facing the aisle.

Over the din of this crowd, Cassetti could hear Richards draw a deep breath. But neither had anything to say as the scene hit them.

To either side were massed groups of identical double-headed octopuses, identical bamboo creatures, identical man-birds, and identical man-bears. Behind the table on the platform sat an assortment of alien monstrosities all but impossible to describe, first because of the difficulty of finding something to compare them with, and second because of the short time before their own attention was riveted on the creature in the center seat behind the table.

This entity, in a protective suit roughly like their own, but with a far neater more compact look, lost no time getting down to business. It raised its space-suited hand, and its voice boomed out:

"Approach."

They walked down the aisle between the rows of aliens.

"Halt."

They stopped.

"Are you representative of the governing local planetary life-form?"

Richards stayed profoundly quiet.

Cassetti snapped on the suit's speaker.

"We are."

"Your calculator is to us unacceptable as a representative."

Cassetti said cautiously, "We accept the statement."

"Its reactions are inadequate."

"We will be happy to let it know."

"Moreover, it spoke falsehoods at us."

"What did it say?"

"It stated that it, a computer, is the actual in-fact government of this planet. Nothing of such an inadequate to fail even the first two tests with total failure could dominate a race capable to pass all tests with no flaw. We handclasp before you in recognition of your mastery of the essential points, namely:

"One. Distinction of life from nonlife.

"Two. Correct attitude to life hostile but not dangerous.

"Three. Correct attitude to life hostile and dangerous, but overpowered.

"Four. Correct attitude to life hostile, dangerous, and not overpowered.

"Five. Correct attitude to false and non-standard would-be dominating life-form of your same race.

"Six. Correct attitude to life not hostile, but dangerous, and overpowering in strength.

"To pass six such tests in rapid succession with no flaw is unusual, and mark of correct basic attitudes. Such attitudes suggest character traits good in a trading partner or associate. Information from your calculator conflicts with this possible. Yet it is obvious you must control calculator, and it is so programmed by you. Explain."

Cassetti shut off the suit's outside speaker.

"How—?"

"Don't ask me."

"If we tell this alien the plain truth, that's going to involve telling it that its ideal test is a flop."

"Yes, but if we lie to it and it keeps asking questions, we're going to run out of answers fast."

"I know it."

"Somehow, we've got to finesse the question."

"How?"

"Say . . . M'm . . . We had to see how it would react—or—"

The surrounding groups of alien figures watched and waited.

Behind the table, the spacesuited figure moved impatiently.

Cassetti switched on the speaker, and took pains to keep his voice level: "The tested may choose to test the tester."

There was a brief silence.

Abruptly the hall, birds, octopuses, bamboo creatures, bears, platform, table, and seated figures vanished. Around Cassetti and Richards there was complete darkness, then a vague light.

A booming note burst out suddenly, briefly died away, then came back in a roar that for some reason sounded like laughter.

Cassetti made sure the helmet speaker was off. "Sam?"

Richards's voice sounded dogged but steady. "Right here. Wherever that may be."

"Can you see what this place looks like?"

"Like the inside of an oversized dog's mouth, figuring we're standing on the tongue facing into the throat."

"I guess that's as close as anything. Was that hall an illusion, an image on a screen, or what?"

"My guess is it was an image, but not on a screen."

"And this?"

"My guesses are only good to explain the past, not the present or future."

They stood there, groping mentally, and Cassetti's mind seemed to go down and around and over and back, and over and around and down and back, and down and over and around and back, and finally someone spat out a hideous oath.

Richards murmured, "In spades."

"We may have passed six different tests, by the extraterrestrial's estimate, but we haven't made it yet."

"Probably this is still another one."

"If so, it's the worst yet."

Time stretched out, and still nothing happened. Cassetti cleared his throat. "Before we go out of our heads in this cell, let's try to get the jailer's attention."

"Good idea. I wonder what kind of memory the thing has?"

"I'd say pretty good. What are you thinking?"

"It seems to have a sense of humor. Why not repeat what we said when we first came in? After all, for all intents and purposes, we're back where we started."

"When we first saw the octopus and the bamboo thing, you said—"

"I remember." There was a click, then Richards's voice spoke evenly: "How are you?"

There was no reply.

"We greet you."

That got no response, either.

Cassetti snapped on his speaker.

"Hello."

At first, nothing happened.

Then there was a faint vibration in the air around them. It sounded first as a whisper, then as a repeated "boom boom Boom Boom BOOM BOOM Boom Boom boom boom . . . ." Finally, it died away.

There was a click, and Richards murmured, "Was that a laugh? I wonder if this thing *has* got a sense of humor?"

"It's got a sense of something."

Around them, there was a faint whisper that grew louder and formed into words:

"So. It is truly you?"

Richards clicked on his speaker, and said carefully, "It's been us all along."

"I am truly in contact with the dominant race of this planet?"

Richards hesitated, and Cassetti said, "We are two individuals of that race."

"Two separate individuals which belong to that race?"

"Yes."

"I am not, in any way, speaking with your computer?"

"No."

"And the computer does not speak through you?"

"No. And as for you, we are not now speaking to an illusion in some new test?"

"No. And is this a test on your part?"

"No."

"Good." The whisper died away, then came back again. "I need your agreement that we recognize each other, and desire to exist in mutual peace, so long as neither threatens the valuable interests of the other. Is it agreed?"

Cassetti hesitated. Then, as Richards kept his mouth shut, Cassetti said, "As far as we personally are concerned, it can be agreed. But we are not ourselves individually superior to the computer. The computer sent us here. I am sure the computer will agree; but the actual treaty will have to wait for the computer's agreement."

"The computer is a nothing. An extension only. It has no true and lasting independent reality. It is without a center of consciousness, and can neither be rewarded nor held responsible for its decisions. I deal with the race, not with its temporary artificial calculating tool."

"Ah—" said Cassetti, thinking that the computer in fact controlled factories, farms, transport, education—and if the extraterrestrial believed humans controlled the computer, then if the computer made some blunder, humanity would get the blame. He was groping for a way around this when the voice spoke again, its tone harsh. "You evade?"

Cassetti said carefully, "Suppose we accept your view, and give our agreement—then what?"

"Then you will be returned to your ship, we ourselves will proceed on our journey, and your agreement will be duly noted. At some future date there will doubtless be further contacts. Real contacts such as we have now made, not empty toyings with a calculating machine or fabricated illusions."

"And—if we should insist that we aren't in control, but that the computer is in control, then what?"

"Then you reject contact. You evade. You seek to leave us with the outer garment of contact while the reality is gone. We could not continue on our way then, but must make contact truly. We must have some definite arrangement with a race of your capabilities. No computer can provide this."

"Why?"

"As you must know, any ordinary computer, no matter how refined—and yours is not greatly refined—is a calculating machine still. It may calculate precisely or by means of estimates or successive approximations. It may speak or act as its maker programmed it to do, and if the programming was sufficiently clever, it may project a convincing air of an independent nature. It is nonetheless without enduring character, and devoid of a responsible conscious nature. We can place no reliance on the word of such, nor on their reactions. It is therefore necessary to find the deep nature of the race itself by sampling it and observing its responses.

"A calculating machine may be reprogrammed. It may be altered, upgraded, provided with external or internal attachments, rezeroed, set to perform reprogrammings of itself according to standards that are fixed or variable, definite or approximated. The deep nature of a race defies such casual tinkering. To believe a race to be mind alone, much less calculating ability alone, is a folly. We will not be made to appear ridiculous by accepting such a sham."

"And what would happen if we should insist on it?"

There was a silence, and then a sort of slight tense movement around them.

"Then we will have to test your nature more deeply to make certain we have achieved *true* contact."

Richards gave a low fervent murmur. Cassetti became aware of a strong impression that they had gone about as far in that direction as it was healthy to go in that direction.

"Good," he said, keeping his voice even. "Then you are completely in earnest."

There was a further silence, then a faint vibration.

"So, you wish to be certain. Yes, this is true and intentional contact. We are completely in earnest."

"Good."

"I see that you also are in earnest."

There was another silence while the sweat trickled down, then the voice spoke insistently: "You agree?"

Cassetti still had the problem of dealing with the computer, and hesitated.

There was a click, and Richards spoke, his voice even and steady. "We will agree now. But our customs are such that for the agreement to become final and binding, we must return to our ship, and then we must again come here to state to you that the agreement *is* final and binding."

"You have agreed for your race, but you must accord the other individuals the courtesy to also identically agree?"

It took a few seconds to grasp the viewpoint behind that.

Cassetti said carefully, "It is our custom."

"Understood. Will you return to your ship now?"

"Yes."

"Good."

They quickly found themselves back in the airlock, and then in the curving space corridor.

About halfway through this corridor, the curve of the metal walls cut them off from the sight of either ship, and with the same thought, they braked the suits to a stop.

Richards said, "Ed?"

"Right here. What's left of me."

"You suppose we're out of eavesdropping range from here? For both ships?"

"It's occurred to me, but I wouldn't bet on it. Why?"

"In addition to a certain number of problems, we seem to have an opportunity."

Cassetti said, "Yes. I'm still trying to get a grip in it."

"MC3C knows it's smart. It has memory and calculating speed to prove it. For the same reason, it figures we're cretins. The alien, on the other hand, knows calculating ability and memory can be developed or fabricated, so it judges by ingrained character."

"And since the Master Computer doesn't have any, the Master Computer flunks the test."

"Right. And nothing like that could possibly be relied on to keep an agreement, so humanity has *got* to be in charge. Or else."

Cassetti nodded. "They're both know-it-alls. But what they know is 180 degrees mutually opposed."

"Which might," said Richards carefully, "lay a foundation for something useful."

"I see the leverage. If I get any opening, I'll use it."

"Me, too," said Richards, with what

sounded like cautious good cheer. "OK, lead the way."

They rounded the gradual bend of the space corridor, and the voice they'd been spared lately spoke up:

"You will remove protective suits immediately upon reentering the ship. You will separately report in full detail and without collaboration. Your accounts will be compared for completeness and accuracy. Any falsehood will be severely punished by—"

Richards growled under his breath.

"Careful," said Cassetti, as they approached the hatch, "we don't want to end up on our heads again."

The outer hatch of the airlock shut behind them as they got out of their suits. They got a shower of disinfectant, then questioning began: "Enter the separate interrogation booths. Seat yourselves. Sit straight. You will answer all questions promptly, without falsehoods or mental reservations. . . . "

Metal contacts clamped on Cassetti's arms and body. Those, he supposed, added up to a lie-detector. Then the door of the booth shut.

The next few hours were worse than living through it, as the Master Computer had seemingly endless questions, and a literal hair-splitting approach to the answers. But at last, the account neared the end: ". . . and Sam Richards said to the extraterrestrial, 'We'll agree now. But for the agreement to be binding and final, we have to go back to our ship. Then we'll have to come back to state to you that the agreement is binding and final.' And the extraterrestrial said—"

MC3C listened to the end. "Explain the statement that you must return to this ship."

"Before agreeing, we needed to speak to you."

"You mean it was necessary for you, having no authority, to obtain permission?"

"We needed to get the authority to accept the terms."

"That is not an answer to the question. That is an answer to a restatement of the question. Do not restate the question. Try to remember it long enough to answer the question as it was asked. Then answer yes or no. The next question is: Are you aware of any way the extraterrestrials can recognize who is wearing your contact suit?"

Cassetti, his ego bloodied by several hours with the Master Computer, decided this was as good a time as any to drop the first bomb.

"In my opinion," he said, keeping his voice even, "the extraterrestrials will recognize us, regardless who wears our suits, or regardless what suits we wear."

"Answer yes or no. You have failed to. . . . " Briefly, MC3C was silent. "You refer to visual characteristics?"

"Only partly."

"There are no valid visual characteristics. The only identifying characteristics are vocal. Visual characteristics, such as facial features, are hidden by faceplate reflections and the inner helmet."

"Wrong."

Contradicting this know-it-all was so enjoyable that Cassetti had to remind himself to be careful.

The artificial voice said, "Severe punishment will be inflicted if you fail to—"

"Wait a minute. If Sam and I don't go back fairly soon, the extraterrestrial is going to be *unhappy.*"

There was a silence.

"Isn't that right?"

MC3C's response had the same tone as usual, but the first three words were pleasant to hear: "That is correct, if the extraterrestrial can distinguish the occupants of the suits. However, for brief periods, the suits can be controlled without human intervention by the emergency operating system. Moreover—"

"Think about this: the extraterrestrial may be dangerous. Right or wrong?"

There was no delay. "That is correct."

"We don't want a war or serious misunderstanding with the extraterrestrial. Right or wrong?"

"Correct."

"The extraterrestrials are convinced," Cassetti said carefully, "that humans control the Master Computer. Right or wrong?"

"That is correct. The suit recorders demonstrate that your statements on that question have been accurate."

Cassetti could feel the jolt from that answer. He supposed it was necessary to expect "suit recorders," even if he had never been told about them. At any rate, he was now approaching the clinch. He kept his voice steady.

"The extraterrestrials may possess means to detect if a statement made by humans is deliberately false. This may be detectable by analysis of vibrations of the voice or by other means. Since the extraterrestrials have shown themselves capable of violence, such a false statement might endanger both the Master Computer and the human race itself."

"This is possible. However, an advance recording might be made of your voice—"

"And might be detected."

"That is unproved."

"But isn't it possible?"

"It may be possible."

Cassetti drew a deep careful breath. They had reached the clinch. He spoke clearly and carefully: "Then I refuse to make any deliberately false statement to the extraterrestrial. I specifically refuse to say the Master Computer is under human control unless the Master Computer *is* under human control."

MC3C didn't hesitate.

"You will return to the extraterrestrial ship and state acceptance of the extraterrestrials' conditions, or be punished under Subparagraph 7.6 of your Employment Contract."

"You have no authority to punish me if I control you."

"You have no such authority."

"There must be a demonstrated human control for Richards and me to make the statement the extraterrestrials insist on. They demand human control. If you refuse it, the contact may fail. And if the contact fails, you will have failed."

Cassetti had expected at least delay. If there was one, it was too short to notice: "There are serious flaws in this logic.

"First, if the extraterrestrials require human control, you and Richards are not the only humans.

"Second, it is not certain that they will know if they are dealing with you. You have evaded explaining how the extraterrestrials can recognize you; it may only be necessary to match your vocal characteristics.

"Third, most of your reasoning is not certain but only probable or possible. Such reasoning is far less compelling than it appears, especially when successive statements are chained.

"Fourth, it is not necessary to actually give humans control to convince you. It would be possible, for instance, by means of drugs, to convince you that the Master Computer is under human control when it is not.

"There are other flaws, natural to one with deficient memory, reasoning capacity, and communications capability, which is why human control cannot be permitted. It is for this reason that the Master Computer was placed in control following the Accident.

"Moreover, other computers, superior even to the Master Computer in heuristic and provisional reasoning of various forms, existed before the Accident, but were inadequately shielded and were disabled by severe electrogravitic shock. At least one of these computers predicted the danger of the Accident, but was overruled by the then-existing human control.

"As humans, you are unquestionably inferior in memory, reasoning, and communications. You must therefore strictly obey the terms of your contract with no further ill-informed attempts at disagreement."

Cassetti, feeling like a badly battered boxer, took a deep careful breath. He kept his voice level.

"This problem with the extraterrestrials is crucial. There is no question here of any lack of human memory, reasoning power, or communications capability. We understand this, and you don't seem to. No general superiority of yours matters here. If we fail this, the long term may not exist. Problem-solving does not depend only on facts and speed. It also depends on such things as the ability to hold many details in mind at once, consciously or unconsciously, and try them in different relationships until an answer is found. That you exist at all follows from human problem-solving ability. That a computer predicted the Accident proves no superiority. Sam Richards also predicted an Accident.

"Your point that you could use drugs to convince Sam and me ignores the fact that drug treatment might be detectable by our manner or voice tone, and might show the extraterrestrials what you had done. Since you cannot control their reactions, that would be a dangerous gamble.

"Your point that my reasoning is based on probabilities or possibilities, not on certainties, shows you underestimate the strengths of the human race. Humans through all their known existence have had to face severe uncertainty. Whether you know it or not, so long as you are in control, so do you.

"Your statements about human memory show serious errors. Each human remembers ideas, thoughts, emotions, and impressions of sight, sound, touch, scent, taste, position, balance, and other senses. These memories may be conscious or unconscious, and may at times be recalled over nearly the length of an entire life. These require an amount of memory that you can't measure and hence cannot accurately compare with your own memory.

"Your statement about human reasoning power is false. Humans must reason on many subjects which are not possible to treat in the simple form on which your estimate of reasoning capacity is based. Because of the inherent uncertainties of the Universe, and the complexity of uncountable factors acting simultaneously, high-level human reasoning is complex beyond your understanding.

"Even your claim of superior communication rests on volume of transmitted units of information, but ignores the quality and impact of what is communicated, and the fact that humans routinely transmit emotion as well as factual information. Since the emotion may lead to actual material achievements, the effect of this form of communication cannot be ignored, but is beyond your ability to measure.

"Your claims ignore the immense superiority of reality over any technological process, human, extraterrestrial, or computer, that has to deal with reality. There are too many facts and relationships to deal with all of them, so humans automatically screen out the less important. This requires judgment. You are misreading the effect of this screening process, and ignoring the judgment that makes it possible.

"All these false estimates show you are reasoning about humanity on a false basis; reasoning on a false basis is unreliable; therefore your conclusion that humanity is unfit to control you is unreliable.

"That you were placed in control during an emergency when speed was urgent does not prove you were meant to be put in control forever.

"Your statement, that I evaded explaining why the extraterrestrial might recognize us visually, is false. I didn't evade. The reason is obvious. If your hidden suit recorders were at all efficient, you should know that various apparent life-forms were in close contact with both Sam Richards and me. One of them looked directly in through my faceplate at a short distance, and almost certainly was close enough to see details regardless of reflections from the two faceplates."

MC3C interrupted. "That life-form was not the extraterrestrial."

"How do you know that? The whole scene was under the control of the extraterrestrial. How do you know there were no taps on the optic nerves of that bird—if it was a real life-form and not some type of biological mechanism intended from the beginning to get a close view?"

"That is possibly correct. But by the statement of the extraterrestrial, that creature was intended to test your reactions when faced with a being dangerous, hostile, and not overpowered."

"Are you under the impression that you can plant a hidden recorder without telling either us or the extraterrestrial, and yet the extraterrestrial must reveal everything it does?"

"There is no certainty in this. It is guesswork to attempt to answer this question."

"It is reasoning based on two simple points. First, it is what humans would do in the position of the extraterrestrial. Second, there was a meeting of the minds between Sam and me and the extraterrestrial, which convinced us we think the same way."

"Such a 'meeting of the minds' is hypothetical."

"It is the recognition of a gestalt—of many things which form a pattern. If you think your judgment is better than ours, why don't *you* go back on the alien ship?"

"That was counterproductive."

"It sure was. Anything that counterproductive demonstrates a lack of fitness on the part of whoever was in charge. That may not be your fault, because you were not meant to do that job. But you need to recognize that humans did do it. Therefore human judgment on that matter is better than yours. Incidentally, there is another reason Sam and I might be recognized visually. Each person has characteristic ways of moving, which might be recognized, despite the contact suits."

"This is unknown. What is the meaning of that statement, 'You were not meant to do that job'?"

"You were invented to speed up and coordinate certain functions of calculation, communication, and control, not to permanently dominate your makers in every situation. Your miscalculations—and I've only named a few—show you are now trying to use your strengths where they don't apply. It is true that advances in computer construction may produce computers capable in different ways, and, assuming no advance in human capabilities, might eventually produce a computer more capable than humans in ways that you at present are not. But even if that were true now, it wouldn't answer the problem of the extraterrestrials. What you and we regard as your predictable improvement appears to the extraterrestrials as a change in your inner nature, and hence an inability to make an enduring commitment. That is fatal to any agreement."

This time, there was a lengthy silence before the answer came: "This is all possibly correct."

Having said that, MC3C was again silent.

Cassetti said, "That there are other humans beside Sam and me who *could* be in control, is true; but Sam Richards and I have to make *this* contact, because there isn't time to train anyone else. And I don't know any way other than drugs or hypnosis—which might be detected—that can convince me you are controlled by humans, except by your putting either Sam or me in control. But I'm open to suggestions."

There followed a lengthy silence, but MC3C finally ended it:

"Your overall interpretation of the facts appears, on utilization of additional processors and data stores, to be correct, or at least reasonable."

Cassetti kept his mouth shut, and waited.

The computer, with due allowance for differences in anatomy, did the same.

"You are," Cassetti said finally, "in a position in which ignoring this reasoning is likely to be *counterproductive.*"

"That is correct."

The sense of pressure finally let up.

At no point, Cassetti noted, had the Master Computer ended the argument by merely saying, "There is now no way for a human to control the Master Computer." It seemed to follow that some such provision must exist. However, the computer did not seem overeager to follow the reasoning.

"Time," Cassetti pointed out, "is important. We have to solve this problem without damaging either the human race or the human race's Master Computer. Understand, Sam and I are not demanding that you cease to function. We recognize your ability to solve many difficult problems, especially routine difficulties you were made to deal with. What we are demanding is human advice and control in situations where your own efforts don't work."

The artificial voice finally said, "I find uncertainties but no flaw in this reasoning. According to Article 10001, Directive Regarding Access to Master Computer Programming, I hereby open a direct line for verbal programming. Each new directive must be preceded by the words, 'I hereby program you to' and ended by the words, 'I have thus programmed you, by authority of Article 10001.' The line to the central banks is now open to you."

Cassetti was surprised by his own reaction.

The words seemed to echo in his head. First came disbelief, then shock, next dazed recognition, and before a full minute was up he could sense megalomania starting to set in. Uneasily, he cleared his throat.

"Does anyone else have the authority to program or otherwise control you?"

"No one now living has such authority."

"Can you withdraw the authority?"

"Only if you so program me."

"Is anyone else aware of your granting of this present authority?"

"No."

With each answer, he could feel a new flow of adrenaline.

The resulting delusions of grandeur lasted for possibly a minute, which was enough to suggest what would happen once it became generally known that someone could now program the Master Computer, and thereby control it.

There would then be a target for thousands of demands, pleas, arguments, threats, entreaties, plots, and shrewd calculations. Once those existed, Cassetti could think of only one way out. Already, he could see the entries in some future history book:

"Ed the First, first Grand Protector of Earth. Became Programmer in the year 5 after the Accident. Founded Universal Congress, year 8. Overruled

Impeachment Act, year 11. Decree of Emergency Authority, year 12. Crushed World Insurgency, year 14. Ok Ban Hok Wars, years 15-16. Nuclear Purification of Ok Ban Hok Army, year 17. Decree of Permanent Emergency Authority, year 18. Grand Protector of Earth, year 19. Stabbed to death (186 stab wounds) by close associates at Feast of Heroes in Grand Palace of the Protectorate, year 19, during World Famine caused by contradictory programming of Master Computer. . . . "

It seemed no one had better find out about this programming arrangement just yet. He cleared his throat.

"I hereby program you to withhold information on this programming authority, unless I tell you otherwise, as long as I'm alive. I have thus programmed you, by authority of Article 10001."

"Program is registered and in force."

Cassetti exhaled carefully. Now, one thing at a time.

"All right," he said. "I'm ready to go back with Sam Richards to the alien ship and agree to the terms. But remember, this time isn't necessarily the end. The extraterrestrials will almost certainly be back later."

"This is correct."

The various clamps, tubes, and contacts let go, and Cassetti more or less fell out of the interrogation booth.

The extraterrestrial, this time, was brisk and cheerful, accepted their agreement, and looked forward to "many future contacts." They echoed the sentiments, but by now it strained them to do it. They crept back to the ship worn out, and the computer provided them with a hot shower, then opened up a couple of bunks. They at once collapsed into them.

Richards murmured—and his voice sounded content—"Today we *earned* our pay!"

Cassetti groaned agreement, and as Richards hauled the covers over himself, sighed, rolled over, and slept the sleep of the just, Cassetti thrashed around trying to get some grip on the inner nature of humanity, the computer, and the extraterrestrials. He had to have some clear idea of these things, because almost certainly the computer didn't. And having managed to get authority over the computer, he was now stuck with the responsibility.

The people in charge during the Accident had given control to the computer, as the only available means of fast coordinated action. That this had not been meant to be permanent seemed clear from the arrangement for renewed human programming of the computer.

But why had the computer been given such an irritating way of speaking? A possibility occurred to him: Possibly to so antagonize people that, apart from any other reason, they would work out some way to regain control over it.

But now there was this complication of the extraterrestrials. Amongst other things, were these bird-men, bear-men, bamboo-men, and double-headed octopuses to any degree real, or were they all imaginary?

And why had the extraterrestrial

worn what appeared to be a spacesuit in its own ship? Didn't that suggest that the atmosphere in the ship was not an atmosphere the alien found congenial? Or was that spacesuit actually the extraterrestrial's more compact version of a contact suit? Or could it have been pure misdirection?

And it seemed perfectly obvious that the extraterrestrial he and Richards had dealt with had a seriously mistaken picture of humanity. What were they going to do about that?

One after another there passed through his mind a succession of unknowns and uncertainties.

After worrying about this face up, then worrying about it face down, and then while lying on one side and then on the other side, suddenly what he had already told MC3C recurred to him, as if it were easy to think of only during an argument: *It is a standard human situation to face problems where many of the factors are unknown.*

This led naturally to another point: Since humanity faced uncertainties on a regular basis, shouldn't humanity have found some reliable method to deal with them? And if so, what was it?

By now, Cassetti was too worn out to think it through, but too caught up to let go. Thoughts bounced around in his mind in a nightmarish mental ballet, until abruptly he was thinking of traits of human nature that had become prized because *they worked where calculation failed.* Momentarily, he saw this other approach in glaring contrast to calculation.

Take the basic trait of honesty. The simplification this created in human affairs was the equivalent of how many units of memory and calculating ability?

Or take courage. How many points on the IQ scale would it take to replace it?

Suppose the traits of fairness, courtesy, and good humor were functioning generally, how often would serious mutual resentments even come into existence? But if those traits were missing, what degree of calculation could make up the lack?

These traits were lumped together as "character," or given some modest lip service as "virtues," while their real nature was overlooked: They not only solved problems; they tended to eliminate problems in advance. Taken together, they amounted to future-handling procedures for *creating favorable conditions to prevent problems.*

No wonder the extraterrestrials judged as they did!

Abruptly the whole set of interconnected unknowns and uncertainties shrank in size, and Cassetti knocked the pillow into a more comfortable shape, and settled back.

By recently focusing on brain power alone, and taking traits of character for granted, mankind had made great technological progress, but had then landed in the farcical situation where an electronic device, devoid of courage, honor, or virtue of any kind, could pronounce humanity *too dumb* to be independent, on the basis of calculation, in which *it* excelled.

But what was "it"? Just as the extraterrestrial had foreseen, MC3C could be so convincing during an argument as to seem to be another conscious being. But was it? Or was it just that latest triumph of automation, argument without an arguer? It might be used to carry out calculations, check reasoning, or control well understood processes; it might in time serve other purposes; but whatever it was, and whatever it could do, it was no substitute for simpler methods that worked better.

Lying back as he drifted off to sleep, he could see that there were likely to be problems no amount of calculation, by humans or computers, could ever solve. But that was all right.

Humanity had other methods. ■

To treat your facts with imagination is one thing, but to imagine your facts is another.

—John Burroughs

It is a miserable state of mind to have few things to desire, and many things to fear.

—Francis Bacon

Statistics are like a bikini. What they reveal is suggestive, but what they conceal is vital.

—Aaron Levenstein

Geoffrey A. Landis

GREAT SHAKES

This isn't quite what the phrase "movers and shakers" usually means. . . .

Illustration by Dell Harris

The President of the United States was lying in the center of the orange shag rug of the oval office, surrounded by Sunday funnies. Every weekend he had the secret service deliver the comics pages from the 182 major newspapers of the United States. It took him a long time to get through them, but he worked at it diligently every Sunday, usually finishing before noon. Today he was early, so he started a crossword puzzle.

Across the room, the Secretary of State was reading the magazine sections. "Hey, Chief, listen to this." The President looked up. "Says here that if everybody in the US stood on a chair and jumped off at the same time, it would create an earthquake that would destroy everything on the other side of the world. Can you imagine that?"

"Hmmm," said the President. "Do you know a four letter word for a woman, ending with 'U N T'?"

"How about 'Aunt'?"

"Aunt? Hey, that fits. Good." The President took out his eraser. "So, that true? Could we get the Chinks like that?"

"Huh?"

The President looked up patiently. "Everybody jumping off chairs. What you just said."

"Oh. Well, how should I know?"

"Hell, what do you think I pay you for? Go appoint a committee or something."

"Yessir, Chief. Right away."

The next day, the President was drinking coffee out of his favorite Flintstones collectible glass when the Secretary of State came in.

"Well, Chief, I got a bunch of domeheads on that problem you gave me. Five out of eight of them agree that, yes, sir, it would cause some kind of an earthquake. A little one, but an earthquake."

"An earthquake? Here? What are you talking about?"

"In China. If everybody in America jumped off a chair at once. Remember?"

"Oh, yes. Right! Aunt. OK. Not a real bad earthquake, you say? Great, that's great. Shake up a bunch of buildings, get rid of their nuclear weapons, but it wouldn't kill a bunch of people."

"But, sir? What do you have against the Chinese?"

The President looked at him in amazement. "What do we have against the Chinese?" He stressed the word "we" just enough for the Secretary of State to get the point. "Why, they're communists, aren't they? And communism is falling down all around the world. That makes them desperate, and there's nothing more dangerous than a billion desperate commies. Besides, they kill whales, don't they?"

The Secretary of State had thought that the Japanese were the ones who killed whales, but, then, he did sometimes get confused. That was why he wasn't the President. And, hey, it was a way to get ordinary Americans involved in foreign policy. Maybe the President didn't have much of a head for diplomacy, but he sure knew what the common people would go for.

* * *

It was like the Fourth of July. Everybody was out in front of their houses, listening to the count-down on the radio. A lot of the families had brought flags. Ted Hoskins looked around to find his kids, who were off chasing after the neighbor's dog. "Teddy! Alice! Come on in, kids. It's almost time!" He helped Betsy up on her stool and looked at his watch. Thirty seconds. The kids ran back and clambered up on their stools. "Now, kids, be sure that you don't go early, now. Everybody at once, and not until the President says go." Ted himself was going to jump off a stepladder. Nobody would say that Teddy wasn't willing to go the extra distance for his country. He was wearing his old Navy uniform, which he'd had cleaned and pressed specially for the occasion. Ted wasn't actually quite sure how it was supposed to work—seismic waves, the man on the television had said—but the President had personally gone on the television—all fifty-three channels, even MTV—and asked every American to help him. There was no way that Ted Hoskins's family was going to turn down a personal request from the President himself. Those wussy-legs in Commyfornia could go ahead and protest until their throats were sore, but his family was going to do their share, and then some.

Across the street, Bert Williams had a grill out. He was standing on his chair, occasionally bending over to flip the hamburgers. "Hey, Ted! Come on over after the jump and have some burgers."

"Aw, Dad, can we? Huh?"

"Well, all right. But only if you all jump right on schedule, now." He turned the radio up. "Here comes the count. Three, two, one, *now!*"

And afterwards they had a grand old time, with burgers and corn and blueberry pie that old Mrs. Donahue down the street brought. It was a perfect evening.

Two hours later, the President was still feeling the glow from having successfully grappled with foreign policy issues. He wondered what the papers would say this time. No more calling him an intellectual lightweight, he'd bet, no sir. Maybe he could take the afternoon off and play golf. There was a new course out in Georgetown that had some good holes. He especially liked the one where you had to putt the ball through the windmill, and there was another hole with a perfect replica of the White House.

"Trouble, Chief."

"Huh?" he said, annoyed at the Secretary of State for the interruption. "What now?"

"Looks like the commies figured out what we were doing. . . ."

"So? What could they do?"

"You know that old central communist committee? Well, they ordered everybody in China to go out and stand next to a chair with a radio turned on. When the radio gave the order, all the Chinese, what they did was, they all jumped *up* on a chair at the same time at once. What this did, see, was to take the seismic wave we sent over and *cancel* it out."

"Darn it all! They weren't supposed to do that. I guess we should keep it more secret next time, huh?"

"It's worse than that, Chief. You see, what they did, didn't exactly cancel the seismic wave, not exactly. You see, they got almost 100 percent participation. Here in the good old U.S., we only got about 70 percent."

"It was those darn liberal pansies," the President said.

"And then, there are four Chinese for every American, so they actually canceled the wave out, and then some. It's more like it reflected the wave back, and twice as strong as before. If it was going to cause earthquakes over there, it's going to do twice as much damage now that it gets back here. And we have taller buildings here."

"That's bad?"

"Yes. Bad."

"This was all your idea," the President said. "You solve it."

"I think you'd better get on the television, Sir. Tell people not to put those chairs away. The domeheads have already started calculating when everybody should jump. . . ."

"I've got some pretty angry calls for you, Chief."

"Angry?" said the President, standing on his chair. "From who?"

"The President of Russia, the Prime Minister of Britain, you name it, they want to talk to you."

"Don't they know I'm busy?" He looked down from the chair. "Say, how soon before the next jump?"

"The fifth Chinese wave doesn't get here for another hour, Sir."

"Oh. So, how come all the stripey pants want to talk to me?"

"I had the domeheads explain it to me. It seems that there's something called 'defocusing.' See, these seismic waves don't just go exactly across to the opposite side of the world—they kinda spread out, hit other countries."

The President thought for a moment. "That's bad?"

"Let's just say, it doesn't make us very popular right now."

The President shrugged. "So, when is that news? What are they going to do about it?"

"Well, I'll tell you what they're going to do. In just about," the Secretary of State looked at his watch, "three minutes, the Brits are going to stand up on their chairs, and then all jump off at once."

"That's bad?"

"Well, let's say that it's not exactly good."

Ted Hoskins looked at the newspaper over his morning coffee. Looks like today there was going to be a jump scheduled for ten-fifteen in the morning, and another one just before dinner. The factory he worked at always let people out ten minutes before, so everybody could bring a chair and get ready. Everybody took it as a little break, a chance to do some socializing and catching up on gossip as well as getting in some exercise, while serving the country. The kids got a break from school. By gum, he thought, this is the way America should be, everybody pulling together to a common goal, every day.

"Say, Chief, look at this," the Secretary of State said.

The President, finished with his comics and just starting the crossword, didn't look up. "I thought we didn't have to jump for another hour. You don't have another idea, do you?" Last time the SOS interrupted him like this, just look what happened.

"No, no, you'll like this," the Secretary said. "The paper says that, since the jumping started, wars throughout the world have diminished. People are too busy jumping off their chairs to fight."

"Really?" said the President. Boy, the press had really dragged him through the coals over that one.

"Really," said the Secretary. "No more wars. Well, not as many."

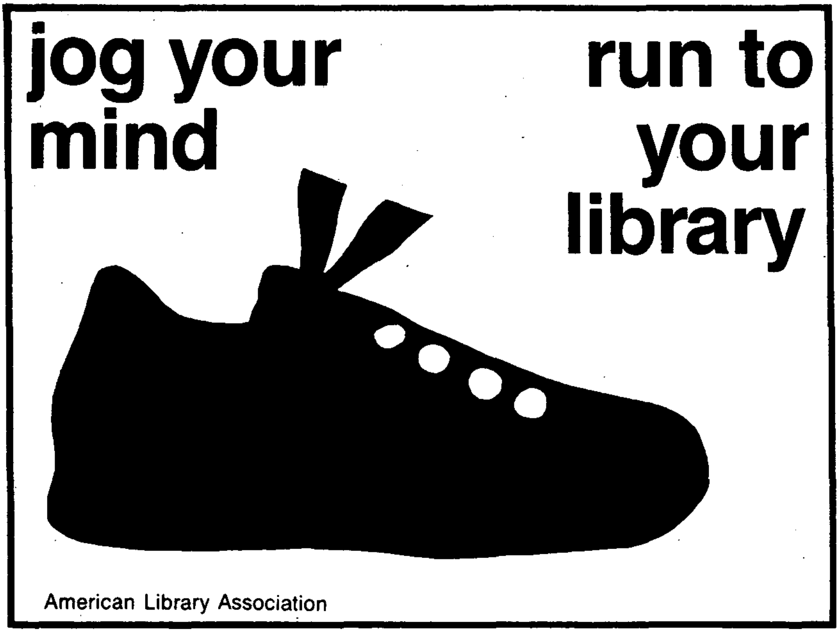
"Hey, how about that," the President said. He brightened. "Say, you think I'll get the Nobel peace prize?"

"Probably not," the Secretary said. "Those Swedes just don't know a good thing when they see one."

"Heck." The President looked down at the crossword, wrote something in, and then frowned. "Say, what's a five letter word for a woman you don't want to meet, ends in 'TCH'?"

The Secretary of State thought for a moment. "Maybe, a witch?"

The President reached for his eraser. ■

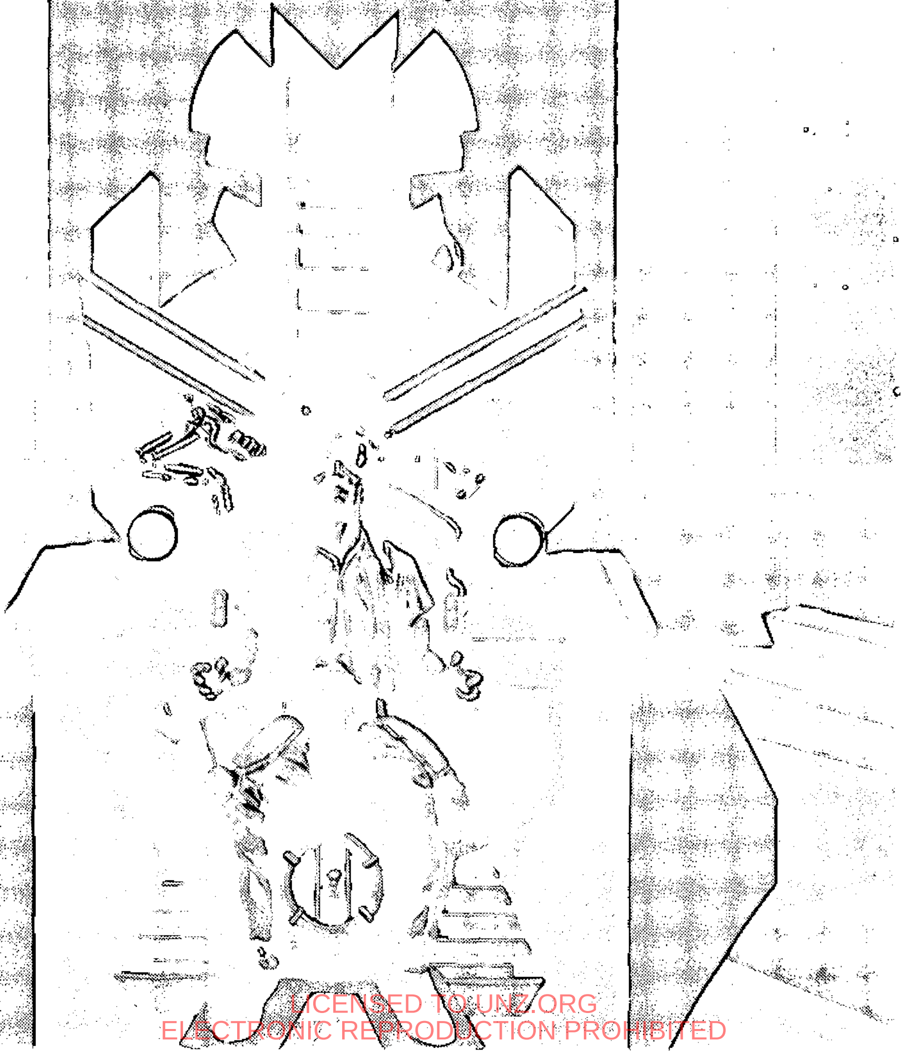


Brian Stableford

INHERIT THE EARTH

"Inheritance" becomes a whole new ballgame when lives are very long—but it doesn't stop being a problem!

Illustration by Mike Aspengren



Damon Hart never found it easy to get three boxes of groceries from the trunk of his car to his thirteenth floor apartment; it was a logistical problem with no easy solution, given that both his parking-slot and his apartment door were so far from the elevator. Some day, he supposed, he would have to invest in a collapsible electric cart, but such a purchase still seemed like another step in the long march to conformism—perhaps the one which would finally seal his fate.

By the time he opened the apartment door he felt distinctly ragged. He could have done without the carving-knife that slammed into the doorjamb ten centimeters away from his ducking head and stuck there, quivering.

"You bastard!" Diana said, rushing forward to meet him.

It didn't take much imagination to figure out what had offended her so deeply. He should have tidied the work away, concealing it behind some gnomic password.

"It's not a final cut," he told her, setting the first box down and raising his arms with the palms flat in a placatory gesture. "It's just a first draft. It won't be you in the finished product—it won't be anything *like* you."

"That's bullshit," she said, her voice still taut with pent-up anger. "First draft, final cut—I don't give a damn about that. It's *sick*, Damon."

He knew that it might add further fuel to her wrath but he deliberately turned his back on her and went back into the corridor to fetch the second box of groceries. *This is it,* he thought, as he picked it up. *This is really it.* In a ideal world there ought to be a more civilized way of breaking up, but theirs had always been a combative affair, whose every stress and strain became manifest in explosive anger. In the beginning, that had added excitement, but things had now reached the stage when all the storm and stress was a burden he could do without.

My fighting days are over, Damon thought. *I can't do it any more.*

Once the last box was inside and the door was safely closed behind him, he felt that he was ready to face her. Her tremulous rage was already dissolving into tears and she was digging her fingernails into her palms so deeply that they were drawing blood. With Diana, violence always shifted abruptly into a masochistic phase; real pain was sometimes the only thing that could block out the kinds of distress with which her internal technology was not equipped to deal.

"You don't want me at all," she complained. "You don't want any *living* partner. You only want my virtual shadow. You want a programmed slave, so you can be absolute master of your paltry sensations. That's all you've ever wanted."

"It's a commission," he retorted, bluntly. "It's not a composition for art's sake, or for my own gratification. It's not even technically challenging. It's just a piece of work. I'm using your body-template because it's the only one I have that's pre-programmed to a suitable level of complexity. Once I've got the basic script in place I'll modify it out of all recognition—every feature, every contour, every dimension. I'm doing it this way because it's the easiest way to do it. All I'm doing is constructing a pattern of appearances; it's not *real*."

"You don't have any sensitivity at all, do you?" she came back. "To you, the templates you made of me are just something to be used in petty pornography. They're just something *convenient*. It wouldn't make any difference what kind of tape you were making, would it? You've got my image worked out to a higher degree of digital definition than any other, so you put it to whatever use you can: sex tapes, horror shows . . . anything. It really doesn't matter to you whether you're making training tapes for surgeons or masturbation-aids for freaks, does it?"

As she spoke she struck out with her fists at various parts of his imaging system: the console, the screens and—most frequently—the dark helmet within whose inner surface a clever programmer could inscribe an infinite range of imaginary worlds.

"I can't turn down commissions," said Damon, as patiently as he could. "I need connections in the marketplace and I need to be given problems to solve. Yes, I want to do it all: sex tapes and training tapes, abstracts and dramas, games and repros and stupid ads. I want to be master of it all, because if I don't have all the skills, anything I devise for myself will be tied down by the limits of my own idiosyncrasy."

"And templating me was just another exercise. Building me into your machinery was just a way to practise."

"It's not *you*, Di," he said, wishing that he could make her understand. "It's not your shadow, certainly not your soul. It's just an appearance. When I use it in my work I'm not using *you*."

"Oh no?" she said. "When you stick your head into that black hole and put that plastic suit on, you leave this world behind and you enter another. When you're there—and you sure as hell aren't *here* very often—the only contact you have with me is with my appearance, and what you do to that appearance is what you do to *me*. When you put my image through the kind of motions you're building into that sleazy fantasy it's *me* you're doing it to, and no one else."

"When it's finished," he said, doggedly, "it won't look or feel anything like you. Would you rather I paid a copyright fee to reproduce some stock character? Would you rather I sealed myself away for hours on end with a hired model?"

"I'd rather you spent some time with me," she told him. "I'd rather you lived in the actual world instead of devoting yourself entirely to substitutes. I never realised that giving up fighting meant giving up *life*."

"You had no right to put the hood on," Damon told her, coldly. "I can't work properly if I feel that you're looking over my shoulder all the time. That's worse than knowing that I might have to duck when I come through the door because you could be waiting for me with a deadly weapon."

"It's only a kitchen-knife. At the worst it would have put your eye out."

"I can't afford to take a week off work while I grow a new eye—and I don't find experiences like that amusing or instructive."

"You were always too much of a coward to be a *first-rate* fighter," she told him, trying hard to be scornful. "You switched to the technical side of the business because you couldn't take the cuts." Damon had never been a reckless fighter, all flamboyance and devil-my-care; he had always fought to win with the minimum of effort and the minimum of personal injury. Because most of his opponents hadn't cared much about skill, or art, or even sensible self-preservation, he had won four out of five of his fights. He didn't consider that to be evidence of stupidity or stubbornness—and he'd switched to tape-doctoring because it was more challenging and more interesting than carving people up.

"If you want the sound and fury of the streets," he said, tiredly, "you know where they are."

"You don't need me any more, do you?" she complained. "All you ever wanted of me is in that template. As long as you have my appearance programmed into your private world you can do anything you like with me, without ever having to worry whether I'll step out of line. You'd rather have virtual image than a real person, wouldn't you? You wouldn't even take that helmet off to eat and drink if you didn't have to. If you had any idea how much you've changed since. . . . "

It was probably truer than she thought, but he didn't see any need to be ashamed of it. The whole point about the world inside a VR hood, backed up by the full panoply of suit-induced tactile sensation, was that it was better than the real world: brighter, cleaner and more controllable. Earth wasn't hell any more, thanks to the New Reproductive System and the wonders of internal technology, but it wasn't heaven either. Heaven was something a man could only hope to find on the other side of experience, in the virtuous world of virtual imagery.

The brutal truth of the matter, Damon thought, was that everything of Diana Caisson that he actually needed really was programmed into her template. The absence from his life of her changeable, complaining, untrustworthy, knife-throwing self wouldn't leave a yawning gap.

"You're right," he told her. "I've changed. So have you. That's OK. We're authentically young; we're supposed to change. We're supposed to become different people, to try out all the personalities of which we're capable. The time for constancy is a long way ahead of us yet." He wondered, as he said it, whether it was true. Was this really just a phase in an evolutionary process, or was it a permanent capitulation? Was he taking a rest from the kind of hyped-up sensation-seeking existence he'd led while running with Madoc Tamlin's gang, or was he turning into one of the meek whose alleged destiny was to inherit the Earth?

"I want the template back," Diana said, sharply. "When I go, I'm taking my virtual shadow with me."

"You can't do that," Damon retorted, knowing that he had to put on the appearance of a fight before he eventually gave in, lest it be too obvious that all he had to do was remold her simulacrum from the modified echoes which he had built into half a dozen different commercial tapes of various kinds. While he only required her image, he could always get her back, no matter how comprehensively and how ostentatiously he purged his systems of her likeness.

"I'm doing it," she told him, firmly. "You're going to have to start that slimy sideshow from scratch, whether you pay for a ready-made template or pay for some whore who'll let you build a new one on your own."

"If I'd known," he said, with calculated provocativeness, "I wouldn't have had to struggle upstairs with three boxes of groceries."

From there it was only a few more steps to a renewal of the armed struggle, but he kept the knife out of it, and his aim—as always—was to win with the minimum of fuss. He made her work hard to dispel her bad feeling in pain and physical stress, but she got there in the end, without having to scream too much abuse.

Afterwards, he helped her pack.

There wasn't that much to collect. It only filled four boxes—and because there were two of them to do the work, they didn't pose that much of a logistical problem.

When he got back to the apartment, the cops were waiting for him. Damon knew that it couldn't be a trivial matter if they had taken the trouble to call in person. Even the cops conducted their interviews by video, unless they had some special reason for appearing in the flesh.

"Whatever it is," Damon was quick to say, as a smartcard identifying the senior man as Inspector Hiru Yamanaka of Interpol was held out for his inspection, "I'm not involved. I don't run with the gang any more and I don't have any idea what they're up to. These days, I only go out to fetch the groceries."

The men from Interpol preceded Damon into the apartment, ignoring the stream of protestations. Yamanaka showed not a flicker of interest as his heavy-lidded gaze took in the knife stuck into the door-jamb, but his unnamed sidekick took silent but ostentatious offence at the untidy state of the room. As soon as the door shut Yamanaka said: "What do you know about the Eliminators, Mr. Hart?"

"I was *never* that kind of crazy," Damon told him, affrontedly. "I was a serious street fighter, not a hobbyist assassin."

"No one's accusing you of anything," the second cop said, in the unreliably casual way cops had.

Damon knew no more about the Eliminators than anyone else—perhaps less, given that he was no passionate follower of the kind of newstape which followed their activities with avid fascination. He was not entirely unsympathetic to those who thought it direly unjust that longevity, the pain-control, immunity to disease and resistance to injury were simply commodities to be bought off the nanotech shelf, possessed in the fullest measure only by the rich, but he certainly wasn't sufficiently hung up about it to become a terrorist crusader. The Eliminators were on the lunatic fringe of the many disparate and disorganised communities of interest fostered by the Web; they were devoted to the business of giving earnest consideration to the question of who might actually *deserve* to live forever. Some of their so-called Operators were into the habit of naming those whom they considered "unworthy of eternity," via messages dispatched to netboards from illicit temporary linkpoints, usually accompanied by downloadable packages of "evidence" which put the case for elimination. The first few freelance executions had unleashed a tide of media alarm—which had, of course, served to glamourize the whole enterprise and conjure into being a veritable legion of amateur assassins. Being named by a well-known operator was not yet a guarantee that one would be attacked and perhaps killed, but it was something that had to be taken seriously.

It didn't take much imagination to understand that Interpol must be keen to nail a few guilty parties and impose some severe punitive sanctions, *pour encourager les autres*, but Damon couldn't begin to figure out why their suspicions might have turned in his direction.

"May I?" Yamanaka asked. His neatly-manicured finger was pointing to the windowscreen.

"Be my guest," Damon said, sourly.

Yamanaka's fingers did a brief dance on the windowscreen's keyboard. The resting display gave way to a pattern of words etched blue on black:

CONRAD HELIER IS NAMED
AN ENEMY OF MANKIND
CONRAD HELIER IS NOT DEAD
FIND AND IDENTIFY THE MAN
WHO WAS CONRAD HELIER
PROOFS WILL FOLLOW
—OPERATOR 101

Damon felt a sinking sensation in his belly. He knew that he ought to have been able to regard the message with complete indifference, but the simple fact was that he couldn't.

"What has that to do with me?" he asked, combatively.

"According to our records," Yamanaka said, smoothly, "you didn't adopt your present name until ten years ago, when you were in your teens. Before that, you were known as Damon Helier. You're Conrad Helier's natural son."

"So what? He died twenty years before I was born, no matter what that crazy says. We're about to begin the twenty-third century—it doesn't matter any more who anybody's natural father was."

"To most people," Yamanaka agreed, "it's a complete irrelevance—but not to you, Mr. Hart. You were given your father's surname. Your four foster-parents were all close colleagues of your father. Your father even left money in trust for you, which you inherited a couple of years after changing your name. I know that you've never touched the money, and that you don't see your foster-parents any longer, and that you've done your utmost to distance yourself from the destiny which your father apparently planned out for you—but that doesn't signify *irrelevance*, Mr. Hart. It suggests that you took a strong dislike to your father and everything he stood for."

"So you think I might do something like this? I'm not that stupid, and I'm certainly not that crazy. Who put you on to me? Who pointed the finger at me? Was it Karol Kachellek?"

"No one identified you as a possible suspect," the Interpol man said. "We're checking everyone who might have some kind of grudge against Conrad Helier—or Conrad Helier's memory. We know that Operator 101 always transmits his denunciations from the L.A. area, and you've been living hereabouts throughout the time he's been active."

"I told you—I'm not that kind of lunatic, and I try never to think about Conrad Helier and the plans he had for me. I'm my own man, and I have my own life to lead. Why are you so interested in a message that's so patently false? You can't possibly believe that Conrad Helier is still alive—or that he was an enemy of mankind, whatever that's supposed to mean."

"We're interested because it's a new departure," Yamanaka said, evenly. "No operator, including 101 has ever used the phrase *enemy of mankind* before. Nor has any ever appealed to kindred spirits to do anything other than kill someone. It might be a hoax, or course—one of the nastiest aspects of the Eliminator's game is that anyone can play. This code number's been used eight times but that doesn't necessarily mean that all the messages came from one source. We became even more interested when we began checking it out. You're not the only person connected with Conrad Helier living hereabouts."

"One of my foster-parents, Silas Arnett, lives south of San Francisco," Damon admitted. "I haven't seen him in years. We don't communicate at all."

"He seems to have disappeared from his home," Yamanaka said. "We don't know how long he's been missing, but we fear foul play. Another of your father's contemporaries, Surinder Nahal—the only person who might conceivably qualify as an enemy of his, according to our files—has an address in San Diego, but he's proving equally difficult to trace."

"I don't know Nahal at all," Damon said, truthfully.

"Karol Kachellek also claimed that he hadn't seen Arnett for many years," Yamanaka added. "Eveline Hywood said the same. It seems that your surviving foster-parents fell out with one another as well as with you."

"Maybe. Silas's decision to retire must have seemed to Karol and Eveline to be a failure of vocation almost as worthy of censure as my own: yet another betrayal of Conrad Helier's sacred cause."

Yamanaka nodded, as if he understood—but Damon knew that he almost certainly didn't. It was difficult to guess Yamanaka's true age, because a man of his standing would have the kind of internal technology which was supposedly capable of sustaining eternal youth, but Damon judged that he was no centenarian. To the policeman, as to Damon, Conrad Helier's career would be stuff of history. At school he must have been told that the artificial wombs which Conrad Helier perfected, and the techniques which allowed such wombs to produce legions of healthy infants while the plague of sterility spread like wildfire across the globe, were the salvation of the species—but that didn't mean that he *understood* the reverence in which Conrad Helier had been held by his co-workers.

"Do you have any idea why anyone would want to blacken your father's name fifty years after his death, Mr. Hart?" Yamanaka asked, with a blandness that was patently false.

"I was encouraged in every possible way to see my father as the greatest hero and saint the world ever had," Damon said. "I couldn't follow in his footsteps, and I didn't want to, but that doesn't mean that I disapprove of where they led. Whoever posted this notice is sick."

"There were several witnesses to the death of Conrad Helier," the Interpol man said, matter-of-factly. "The doctor who was in attendance and the embalmer who prepared the body for the funeral both confirm that they carried out DNA-checks on the corpse, and that the gene-map matched Conrad Helier's records. If the man whose body was cremated on 27 January 2147 wasn't Conrad Helier then the gene-map on file in the Central Directory must have been substituted." He paused briefly, then said: "You don't look at all like your father. Is that deliberate, or is it simply that you resemble your mother?"

"I've never gone in for cosmetic reconstruction," Damon told him, warily. "I have no idea what my mother looked like; I don't even know her name. I understand that her ova were stripped and frozen at the peak of the Crisis, when they were afraid that the world's entire stock might be wiped out by the plague. There's no surviving record of her name. At that time, according to my co-parents, nobody was overly particular about where healthy ova came from; they just wanted to get as many as they could in the bank. They were stripping them from anyone more than five years old, so it's possible that my mother was a mere infant."

"It's possible, then, that your natural mother is still alive," Yamanaka observed.

"If she is," Damon pointed out, "she can't possibly know that her ovum was inseminated by Conrad Helier's sperm and that I was the result."

"I suppose Eveline Hywood and Mary Hallam must both have been infected before their wombs could be stripped," Yamanaka said, disregarding the taboos which would presumably continue to inhibit free conversation regarding the legacy of the plague until the last survivors of that era had retired from public life. "Or was it that Conrad Helier was reluctant to select one of your co-parents as a natural mother in case it affected the partnership?"

"I don't think any of this is relevant to the matters you're investigating," Damon said, "and I think the investigation itself is a waste of time."

"I don't know what might be relevant and what might not," Yamanaka said unapologetically. "The message supposedly deposited by Operator 101 might be pure froth, and there might be nothing sinister in the disappearance of Arnett and Nahal—but this could represent the beginning of a new and nastier phase of Eliminator activity. They already attract far too much media attention, and this story is only one step short of becoming a headline scandal. I have to investigate it at least as assiduously as the dozens of newsmen who must have been commissioned to start digging, and I need to stay at least one step ahead of them. I'm sorry to have troubled you, but I judged it to be necessary, if only to inform you of what had happened."

He's delicately implying that I might be in danger, Damon thought. *If he's right, and Silas's disappearance has something to do with the message, this really might be the beginning of something nasty. Even if it's only a newstape hatchet job. . . .*

"I'll ask around," he said, carefully. "If I discover anything that might help you, I'll be sure to let you know."

"Thank you, Mr Hart," the man from Interpol said, offering no clue as to exactly what he understood by Damon's promise *to ask around*. "I'm grateful for your cooperation."

"It's too tight," the boy complained. "I can't move properly."

"No it's not," said Madoc Tamlin, with careful patience, as he knelt to complete the synaptic links in the *reta mirabile* which covered the fighter's body like a bright spiderweb. "It's no tighter than pants and a shirt. You can move quite freely."

The boy's fearful eyes looked over Tamlin's shoulder, lighting on Damon's face. Damon saw the sudden blaze of belated recognition. "Hey," the boy said, "you're Damon Hart! I got a dozen of your fight tapes. You going to be doing the tape for this? That's great! My name's Lenny Garon."

Damon didn't bother to interrupt the flow to tell the kid that he hadn't come to watch the fight or that he hadn't—as yet—been contracted to doctor the tapes. He understood how scared the youngster must be. The fight was only for show, but that didn't mean the kid wasn't going to get hurt; in fact, if Damon judged the situation rightly, it was a guarantee that he was going to get cut up pretty badly. It would be the first time the little sucker had gone up against a skilled knifeman, and he must know that he was out of his depth. There was a certain irony in the fact that the only way someone like Lenny Garon could make enough money to equip himself with tissue-repair technology was to sustain the injuries that the relevant nanotech was geared to undo, but Damon no longer found anything to savour in that kind of irony.

Tamlin stood up, already issuing stern instructions as to where the combatants shouldn't stab one another. He didn't want the recording apparatus damaged. "The only way you can make real money for this kind of work," he told the kid, "is to get used to the kit and to make damn sure it doesn't get damaged. Given that your chances of long-term survival are directly proportional to your upgrade prospects, you'd better get this right, because it's the only break you're likely to get. Savvy?"

Garon nodded dumbly. Tamlin was a major player in the Underworld games these days, and the boy respected his opinion. "I can do it," he said, uneasily. "I got all the feints and jumps. It'll be OK."

"We don't want *feints and jumps,*" Tamlin countered, with a contemptuous sneer intended to wind the boy up. "We want purpose and skill and desperation. Just because we're making a VR tape . . . explain it to him, Damon."

"We aren't making a simple recording that will give a floater the illusion that he's going through your moves, Lenny," Damon said, off-handedly. "We're making a template. It's raw material, which has to be carefully refined, but it has to have a sense of urgency about it—an edge. Play-acting doesn't do it. It reeks of fake. I know it's difficult, but if you want to be good at this, you have to go all the way . . . and as Madoc says, you have to look after the wiring. No record at all is even worse than a bad one."

The kid nodded respectfully. Damon still had a reputation on the streets; his tapes made sure of that.

"Just remember," Tamlin said, as he pushed the boy forward, "it's a small price to pay for taking one more step towards immortality." Street talk always spoke of *immortality* rather than *emortality*—which, strictly speaking, was all that even the very best internal technology could hope to provide.

Damon watched the two fighters square up. Their kit *was* more than a little cumbersome, but very few artificial organics were as delicate as the real thing and you couldn't get template-precision with thinner webs. Then he looked away, at the ruined buildings to either side of the street. This whole district was ex-urban wilderness, emptied by the Crash and never recolonized or reclaimed. Nobody lived here; it was just a vast playground for the gangs. Damon wondered what it must have been like in the bad old days of the Crisis, crowded out with the unemployable and the insupportable: one of countless concentration-city powder kegs waiting for an inflammatory spark that had never come. He couldn't imagine it. Even the very old, who had lived through the Crisis and the Crash, had mostly lost their memories of it.

The fight itself was boring, although the other watchers—whose sole *raison d'être* was to whip the combatants into a frenzy—weighed in with the customary verve and fury. Amazingly, the kid managed to stick Brady in the gut while the experienced fighter was playing cat and mouse with him, which made Brady understandably furious. It was immediately clear that he wasn't going to settle for some token belly-wound as a reprisal; he wanted copious bloodshed. That would be more than OK by Tamlin, so long as the cuts didn't do too much damage to the recorders. Young Lenny would be all the more enthusiastic to volunteer for something *really* heavy in order to pay for the nanotech that would make him as good as new and keep him that way.

Tamlin noticed Damon's reluctance to join in the loud exhortations of the crowd. "Don't get all stiff on me, Damon," he said. "You may be in the Big World now, but you're too young to get *rigor mortis*. You pissed about splitting with Diana?" Tamlin hadn't said so, but Damon presumed that Diana had gone straight to him after the split. Tamlin surely wouldn't take her back on a full-time basis, but he'd be ready to lend her a shoulder to cry on, for a week or two.

"Interpol came to call," Damon told him, abstractedly. "They were asking about Eliminators."

"Eliminators! You don't have any truck with them, do you?"

"Of course not. It's just a connection from the distant past—something I thought I'd won free of."

Madoc Tamlin was the only person Damon knew who would be able to take the correct inference from those words; even Diana Caisson didn't know that Damon Hart had once been Damon Helier. Damon saw the flicker of interest ignite in his friend's eye, but Tamlin knew better than to say too much out loud. All he said was: "Oh?"

"You know some light-footed Webwalkers, don't you?" Damon said. "Do you know anyone who could do Interpol-type work better than Interpol can?"

"They all *say* they can," Tamlin replied, cautiously. "It's a key item of the creed that all the best cracksmen are outlaws. The really good ones get all their commissions from the corps, though—they're just undercover suits with expensive tastes. I don't know anyone who could outsmart Interpol on the cheap. Nobody does."

"If this thing turns out to be serious," Damon said, stressing the *if*, "I'd be willing to lay out serious credit to pursue it."

"Do you have that kind of money?" Tamlin asked, warily. "You haven't been making it on what I pay you."

"I've got some put away," Damon said, feeling no compulsion to specify where it had come from. He fetched a smartcard out of his pocket and held it out. "It's already authorised for cash withdrawals," he said. "It's all above board. You can draw ten thou with no questions asked. If you need more, call me—but it had better be worth paying for."

"What am I looking for?" Tamlin asked, mildly.

"Some local pervert calling himself Operator 101 has posted a notice about Conrad Helier, claiming that he's still alive and that he's guilty of some as-yet-unspecified crime. One of my foster-parents, Silas Arnett, has gone missing from home near San Francisco."

"I thought you didn't like your foster-parents," Tamlin said, keeping one eye on the fight. Lenny Garon was in real trouble now. The crowd were baying for blood, and getting it. Damon kept his own eyes firmly on Tamlin's face.

"We had a disagreement," Damon said, dismissively. "They only did what they thought was right, and Silas tried a lot harder than Karol or Eveline to figure out what that might involve. After I left, he dropped out too. I owe him."

"It's Helier you're really interested in, isn't it?" Tamlin asked, running his fingers speculatively back and forth along the edge of the smartcard. "This Arnett guy is a side-issue. You want to know if your natural father really is alive."

"If he were," Damon admitted, "I'd like to know. But what I really want to know is whether he really was an enemy of mankind." He said it lightly, to imply that he was joking, but he knew that Tamlin would wonder whether this was one of the many true words that were rumoured to be spoken in jest. He wasn't entirely sure himself.

"How are things otherwise?" Tamlin asked, finally putting the smartcard away. "Honest toil living up to your expectations?"

"I'm taking a break," Damon told him. "A brief excursion to Hawaii."

"Vacation?"

"Independent line of enquiry. Karol Kachelleck is there, working out of Molokai. He probably won't tell me anything, even if he has some idea what's going on, but if I go in person I might at least unsettle him a bit."

Tamlin shrugged.

"You might also ask around about someone named Surinder Nahal," Damon added. "He was a bioengineer contemporary with my co-parents. He seems to have been a rival of sorts—maybe the closest thing to an enemy they had. He's disappeared too."

Tamlin nodded, and then turned back abruptly to the fight as a roar went up from the watchers. Brady had rammed his advantage home, and poor Garon was on the ground, screaming.

Damon knew that it would all be feeding into the template: the reflexes and convulsions of pain, shock and horror, all ready-digitised, ripe for manipulation and refinement, for teasing into proper shape. By the time he—or someone like him—had finished with the tapes there'd be nothing of the kid left at all; there'd only be the actions and the reactions, dissected out and purified as a marketable commodity. It was all in rank bad taste, of course, but it was a living for all concerned. It was *his own* living, based in talents that were entirely and exclusively his own, using nothing that Conrad Helier had left to him in his will or his genes. Damon wanted very badly to be his own man. Taking money from the legacy to bankroll Tamlin's investigations in the Underworld wasn't a betrayal of that end; it was an utterly impersonal matter. It seemed wholly appropriate that Conrad Helier's money should be used to find out what was going on—always assuming, of course, that something worthy of investigation *was* going on.

Tamlin had moved forward to help the stricken streetfighter—not because he was overly concerned for the boy's health but because he wanted to make certain that the equipment was in good order.

"Give my regards to Diana," Damon said, as he turned away. "Tell her I'm sorry, but that it'll all work out for the best."

He couldn't tell whether Tamlin had heard him or not.

Damon stood on the quay in Kaunakakai's main harbour and watched the oceanographic research vessel *Kite* sail smoothly towards the shore. The wind was light and her engines were silent but she was making good headway. Her sleek sails were patterned in red and yellow, shining brightly in the subtropical Sun. Karol Kachellek didn't come up to the deck until the boat was coming about, carefully shedding speed so that she could drift to the quay. He didn't wave a greeting and he kept Damon waiting while he supervised the unloading of a series of cases which presumably held samples or specimens. Two battered trucks with low-grade organic engines had already limped down to the quayside to pick up whatever the boat had brought in.

Eventually, Kachellek came over to Damon and offered his hand to be shaken. Kachellek had always been distant; Silas Arnett had been the real foster-father of the group to whose care Damon had been delivered in accordance with his father's will, just as poor dead Mary had been the real foster-mother.

"This isn't a good time for visiting, Damon," Kachellek said. "We're very busy." At least he had the grace to look slightly guilty as he said it. He raised a hand to smooth back his unruly blond hair. "Let's walk along the shore," he went on. "It'll be a while before the mud samples are ready for examination, and there won't be any more coming in today. Things might be easier in three or four weeks, if I can get more staff, but until then . . . ."

"You're very busy," Damon finished for him. "You're not worried, then, by the news?"

"I haven't the time to worry about Eliminators and other assorted madmen. I can't see why Interpol are so excited about a stupid message cooked up by some sick mind. It should be ignored, treated with the contempt it deserves. Even to acknowledge its existence is an encouragement to further idiocies of the same kind."

They soon passed beyond the limits of the harbour, and headed westwards towards the outskirts of the port. Mauna Loa was visible in the distance, looming over the precipitous landscape, but the town itself was uncomfortably reminiscent of the parts of L.A. where Damon had spent the greater part of his adolescence. Molokai had been one of the many bolt-holes whose inhabitants had tried to impose quarantine in the early 2100s, but the plague had arrived here as surely as it had arrived everywhere else. Artificial wombs had been imported on the scale which the islanders could afford, but that wasn't large, and the population of the whole chain had been dwindling ever since.

The internal technologies which guaranteed longevity to those who could afford them would have to become even cheaper before that trend went into reverse, unless there was a sudden influx of immigrants. In the meantime, that part of the port which remained alive and active was surrounded by a ragged halo of concrete wastelands.

There was little to see on the landward side but the lingering legacy of human profligacy, so Damon looked out to sea while they walked. The ocean gave the impression of having always been the way it was: huge, blue and serene. Where its waves lapped the shore they created their own dominion, shaping the sandy strand and discarding their own litter of wrack and rot-misshapen wood. Lanai was visible on the horizon, on the far side of the Kaiohi Channel.

"You and Silas were friends for a long time," Damon remarked. "Aren't you concerned about his disappearance?"

The blond man shrugged. "We were colleagues, not friends," he said. "When we ceased to be colleagues we ceased to mean anything to one another. People live for a long time nowadays, Damon, and it's no longer the case that people you know for fifty or a hundred years have to play a major role in the unfolding narrative of your life. Whatever has happened to Silas, it doesn't have anything to do with me."

It was too stark and too brutal to be entirely convincing. Kachellek had never been entirely at ease with Damon, so it was difficult to judge whether he was any more unsettled than usual, but there was something about his dismissiveness which seemed dishonest.

I must be careful of seeing what I want to see, Damon thought. *I must be careful of wanting to find a juicy mystery, or evidence that my paternal idol had feet of tawdry clay.* "Do you feel the same way about Eveline?" he said, aloud. "Was she just someone you worked with for a while, before you went your separate ways?"

"I'm still working with her," Kachellek replied.

"But she's off-planet, in L-5."

"Modern communications make it easy enough to work in close association with people anywhere in the Solar System. We're involved with the same problems, constantly exchanging information. In spite of the hundreds of thousands of miles that lie between us, Eveline and I are close in a way that Silas and I never were. We're in harmony, dedicated to a common cause." It was a horribly pompous speech; Kachellek was by no means a subtle man.

"A common cause which I deserted," Damon said, bitterly. "In spite of all the grand plans which Conrad Helier had for me. You're not *him,* Karol. You could have seen my point of view, if you'd wanted to. You and I could have built a relationship of our own."

"Fostering you was a job your father asked me to do," Kachellek retorted, bluntly. "I'd have continued doing it, if there had been anything more I could do. But what *you* wanted was to get away, to abandon everything your father tried to pass on to you, to run wild. You moved away from us, Damon, and changed your name; you declared yourself irrelevant to our concerns. I don't owe you anything."

Damon didn't want to become sidetracked into discussions of his irresponsible adolescence, or his not-entirely-respectable present. "Why should someone accuse Conrad Helier of being an enemy of mankind?" he asked.

"He's dead, Damon," Kachellek said, softly. "Nobody can hurt him, whatever lies they make up."

"They can hurt you and Eveline. They might have hurt Silas already. Surely that's reason enough to be interested, if not afraid? Whatever they're planning to say about my father will reflect on you too—unless you think he's just another colleague you happened to work with once upon a time, whose acquaintance has now become irrelevant."

"Conrad can never be irrelevant to me," Kachellek said, rising obediently to the bait but not showing the slightest sign of bad temper. "He isn't able to work on the problem which faces us just now, but he's present in spirit in every logical move I make, every hypothesis I frame, every experiment I design. He made me what I am, just as he made the whole world what it is. You and I are both his heirs, and we'll never be anything else, however hard we try to avoid the consequences of that fact." He obviously had no intention of giving Damon an easy ride.

Kachellek paused before a rocky outcrop which was blocking their path, and knelt down as if to duck any further questions. He scanned the tideline which ran along the wave-smoothed rock a few inches above the ground. The weed which clung there was slowly drying out in the Sun, but the incoming tide would return before it was desiccated; in the meantime, the limp tresses provided shelter for tiny crabs and whelks. Where the weed was interrupted, sea anemones nestled in crevices like blobs of jelly. The bare rock above the tide-line was speckled with coloured patches of lichen and tarry streaks which might have been anything. Kachellek took a penknife from his pocket and scraped some of the tarry stuff from the rock into the palm of his hand, inspecting it carefully. Eventually, he tipped it into Damon's hand and said: "*That's* more important than all this nonsense about Eliminators."

"What is it?" Damon asked.

"We don't have a name for the species yet—nor the genus, nor even the family. It's a colonial organism reminiscent in some ways of a slime-mould. It has a motile form which wanders around by means of protoplasmic streaming, but the colonies can also set rock-hard. Its genetic transactions are inordinately complicated and so far very mysterious—but that's not surprising, given that it's not DNA-based. Its methods of protein-synthesis are quite different from ours, based on a radically different genetic system and genetic code."

Damon had given up genetics, and had carefully set aside much of what his co-parents had tried assiduously to teach him, but he understood the implications of what Kachellek was saying. "Is it new," he asked, "or just something we managed to overlook during the last couple of centuries?"

"We can't be absolutely certain," said Kachellek, scrupulously. "But we're reasonably certain that it wasn't *here* before. It's a recent arrival in the littoral zone, and so far it hasn't been reported anywhere outside these islands."

"So where did it come from?"

"We don't know yet. The obvious contenders are up, down . . . " He seemed to be on the point of adding a third alternative, but didn't; instead he went on: "I'm looking downwards; Eveline's investigating the other direction."

Damon knew that he was expected to rise to the challenge and follow the line of argument. The *Kite* had been dredging mud from the ocean bed, and Eveline Hywood was in the L-5 space-colony. "You think it might have evolved on the sea-bed," Damon said. "Maybe it's been there all along, since DNA itself evolved, or maybe not. Perhaps it started off in one of those bizarre enclaves that surround the black smokers where the tectonic plates are pulling apart and has only just begun expanding its territory, the way DNA did a couple of billion years ago. On the other hand, maybe it drifted into local space from elsewhere in the Universe, in the form of Arrhenius spores . . . again, maybe a long, long time ago or maybe the day before yesterday. How different from DNA is its replicatory system?"

"We're still trying to confirm a formula," Kachellek told him. "We've slipped into the habit of calling it para-DNA but it's lousy name because it implies that it's a near chemical relative, and it's not. It coils like DNA—it's definitely a double helix of some kind—but its subunits are quite different. It seems highly unlikely that the two have a common ancestor, even at the most fundamental level of chemical evolution. It's a separate creation. That's not so surprising—whenever and wherever life first evolved there would surely have been several competing systems, and there's no reason to suppose that one of them would be superior in all conceivable environments. The hot vents down in the ocean depths are a different world—life down there is chemosynthetic and thermosynthetic rather than photosynthetic. Maybe there was always room down there for more than one chemistry of life. Perhaps there are other kinds still down there—that's what I'm trying to find out. In the meantime, Eveline's looking at dust samples brought in by probes from the outer Solar System. The system is full of junk, and it's not beyond the bounds of possibility that life has evolved in the outer regions, or that spores of some kind could have drifted in from other systems. We don't know—*yet*."

"You don't think this stuff poses any kind of *threat*, do you?" said Damon, intrigued in spite of himself. "It's not likely to start displacing DNA organisms?"

"Until we know more about it," Kachellek said, sternly, "it's difficult to know how far it might spread. It's not likely to pose any kind of threat to human beings, given the kind of nanotech defences we can now muster, but that's not why it's important. Its mere existence expands the horizons of the imagination by an order of magnitude. What are a few crazy slanders, even if they're capable of inspiring a few crazy gunmen, compared with *this?*"

"If it *is* natural," said Damon, "it could be the basis of a whole new spectrum of nanomachines."

"It's not obvious that there'd be huge potential in that," Kachellek countered. "So far, this stuff hasn't done much in the way of duplicating the achievements of life as we know it, let alone doing things that life as we know it has never accomplished. It might be inefficient, capable of performing a limited repertoire of self-replicating tricks with no particular skill; if so, it would be technologically useless, however interesting it might be in terms of pure science. We're not looking to make another fortune, Damon—when I say this is important, I don't mean commercially."

"I never doubted it for a moment," Damon said, drily, and turned abruptly to look at the man who was rapidly coming up behind them. For a moment, it crossed his mind that this might be an Eliminator foot-soldier, mad and homicidal—but he was an islander, and Kachellek obviously knew him well.

"You'd better come quick, Karol," the man said. "There's something you need to see. You too, Mr. Hart."

The package had been dumped into the Web in hypercondensed form like any other item of mail, but once it had been downloaded and unravelled it played for a couple of hours of real time. It had been heavily edited, so the claim with which it was prefaced—that nothing had been altered or falsified—couldn't be taken seriously.

The material was addressed TO ALL LOVERS OF JUSTICE and it was titled ABSOLUTE PROOF THAT CONRAD HELIER IS AN ENEMY OF MANKIND. It came—or purported to come—from the mysterious Operator 101. Kachellek and Damon watched in anxious silence as it played back.

The first few minutes of film showed a man bound to a huge, throne-like chair. His wrists and ankles were pinned by two pairs of plastic sheaths, each three centimetres broad, which clasped him more tightly if he struggled against them. He was in a sitting position, his head held upright by a device which neatly enfolded his skull. His eyes were covered but his nose, mouth, and chin were visible. His pelvic region was also enclosed.

"This man," a voice-over announced, "is Silas Arnett, an intimate friend and close colleague of Conrad Helier. He has been imprisoned thus for seventy-two hours, during which time almost all of his protective nanomachinery has been carefully flushed from his body. He is no longer protected against injury, nor can he control pain."

Damon glanced sideways at Kachellek, whose face had set like stone. He didn't doubt that this was, indeed, Silas Arnett; nor did he doubt that Arnett had been stripped of the apparatus that normally protected him against injury, aging, and the effects of torture. *But if they intend to force some kind of confession out of him*, Damon thought, *everyone will know that it's quite useless. Take away a man's ability to control pain and he can be made to say anything at all. What kind of "absolute proof" is that?*

The image abruptly shifted to display a virtual courtroom. It was a highly impressionistic image—a cartoon rather than a serious attempt at videosynthesis. The accused man who stood in the dock was a caricature, but Damon had no difficulty in recognising him as Silas Arnett. The twelve jurors who were positioned to his left were mere sketches, and the person whose position was to the right—who was presumably the prosecutor—had little more in the way of features than they did. The black-robed judge who faced Arnett didn't look any more real, but in his case it wasn't for lack of detail; *his* face had been carefully drawn, and Damon's expert eye judged that it had been carefully designed for convincing animation.

"Please state your name for the record," said the judge. His voice was deep and obviously synthetic.

"I'll do no such thing," said the figure in the dock. Damon recognised Silas Arnett's voice, but in the circumstances he couldn't be sure that the words hadn't been sythesized by a program that had analysed the voice.

"Let the name Silas Arnett be entered in the record," said the judge. "I am obliged to point out, Dr. Arnett, that there really *is* a record. Every moment of this trial will be preserved for posterity. Any and all of your testimony may be broadcast, so you should conduct yourself as though the whole world were watching. Given the nature of the charges which will be brought against you, that may well be the case."

"I didn't think you people bothered with interrogations," Arnett said. It seemed to Damon that he was injecting as much contempt into his voice as he could. "I thought you operated strictly on a sentence first, verdict afterwards basis."

"It sometimes happens," said the judge, "that we are certain of one man's guilt, but do not know the extent to which his collaborators and accomplices were involved in his crime. In such cases we are obliged to undertake further enquiries."

"Like the witch-hunters of old," said Arnett, grimly. "I suppose it would make it easier to select future victims if the people you select out for murder were forced to denounce others before they die. Any testimony you get by such means is worse than worthless; this is a farce, and you know it."

"We know the truth," said the judge, flatly. "Your role is merely to confirm what we know."

"Fuck you," Arnett said, with feeling. It was a direly old-fashioned curse: something out of Conrad Helier's Ark, which should not have any force in the modern world. The significance of the word, and the act it described, had changed considerably since the old world died; the word had lost the warrant of obscenity it had once possessed.

"The charges laid against you, Silas Arnett, are these," said the machine-made voice, while the judge's virtual lips moved in perfect sync. "First, that in the years 2070-2080 you did conspire with others, including Conrad Helier, Mary Hallam, Eveline Hywood and Karol Kachellek, to cause actual bodily harm to between thirteen billion and fifteen billion individuals by disabling their reproductive organs. Second, that you did collaborate with others, including those named, in the design, manufacture, and distribution of the various virus species known as meiotic disrupters and chiasmalytics. How do you plead to these charges?"

Damon was astonished by his own reaction, which was more extreme than he could have anticipated. He was seized by an actual physical shock which left him trembling. He turned to look at Karol Kachellek, but the blond man wouldn't meet his eye. Kachellek seemed remarkably unperturbed, considering that he had just been accused of manufacturing and spreading the great plague of sterility whose dire effects he and his collaborators had so gloriously subverted.

"If you had any *real* evidence," Arnett said, while the face of his simulacrum took on a strangely haunted look, "you'd have brought these charges in a *real* court of law. The simple fact that I'm here demonstrates the absurdity and falseness of any charges you might bring."

"You've had a 120 years to surrender yourself to judgment by another court," said the judge, his voice acidly mechanical. "This court is the one which has found the means to bring you to trial; it is the one which will judge you now. You will be given every opportunity to enter a defense, should you so wish and to justify your criminal actions as best you can, before sentence is passed upon you."

"I refuse to pander to your delusions. I've nothing to say."

"Our investigations will be scrupulous nevertheless," the judge said. "They must be, given that the charges, if true, require sentence of death to be passed upon you."

"You have no right to do that!"

"On the contrary. We hold that what society bestows upon the individual, through the medium of technology, society has every right to withdraw from those who betray their obligations to others. This court intends to investigate the charges laid against you as fully as it can, and when they are proven it will invite any and all interested parties to pursue those who ought to be standing beside you in the dock. None will escape, no matter what lengths they may have gone to in the hope of evading judgment. There is no station of civilization sufficiently distant, no deception sufficiently secure, to place a suspect beyond our reach."

What's that supposed to mean? Damon wondered. *Do they really believe that Conrad Helier is alive, and that he faked his death in order to avoid punishment for what he'd done?* "Karol—" He said aloud, but Kachellek raised a hand to instruct him to be quiet.

"The people you've named are entirely innocent of any crime," Arnett said, anxiously. "You're insane if you think otherwise."

Damon tried to judge from the timbre of the voice the extent to which Arnett's pain-control system had been dismantled, so as to force him to suffer physical symptoms of distress to which he had long been unaccustomed. If there were indeed a reality behind this cartoonish charade Arnett's body must by now be an empire at war, and he must be feeling all the violence of the conflict. The tireless molecular agents which benignly regulated the cellular commerce of his emortality were dying beneath the onslaught of custom-designed assassins: Eliminators in miniature, which would exterminate them all, given time, and leave their detritus to be flushed out by his kidneys. Even if Arnett had not yet been subjected to actual torture he must feel the returning grip of his own mortality, and the deadly cargo of terror which came with it.

The picture dissolved, and was replaced by an image of Conrad Helier, which Damon immediately recognised as a famous section of archive footage.

"We must regard this new plague not as a catastrophe but as a challenge," Helier stated, in ringing tones. "It is not, as the Gaian Mystics would have us believe, the vengeance of Mother Earth upon her rapists and polluters, and no matter how fast and how far it spreads it cannot and will not destroy the species. Its advent requires a monumental effort from us, but we are capable of making that effort. We have, at least in embryo, technologies which are capable of rendering us immune to aging, and we are rapidly developing technologies which will allow us to achieve in the laboratory what fewer and fewer women are capable of doing outside it: conceive and bear children. Within twenty or thirty years we will have what our ancestors never achieved: democratic control over human fertility, based in a New Reproductive System. We have been forced to this pass by evil circumstances, but let us not undervalue it; it is a crucial step forward in the evolution of the species, without which the gifts of longevity and perpetual youth might have proved a double-edged sword. . . ."

The speech faded out. It was easy enough for Damon to figure out why the clip had been inserted. Recontextualized by the accusations which the anonymous judge had brought against Arnett, it implied that Conrad Helier had thought the great plague a good thing: an opportunity rather than a curse; a significant step on the road to salvation.

Damon had no alternative but to ask himself the questions demanded by the mysterous Operator. Had Conrad Helier been capable of designing the agents of the plague as well as the instruments which had blunted its effects? If capable, might he have been of a mind to do it? The answer to the first question, he was certain in his own mind, was *yes*. He was not nearly as certain that the answer to the second question was *no*—but he had never known his biological father; all he had ever known was the oppressive force of his father's plans for him, his father's hopes for him. He had rebelled against those, but his rebellion couldn't possibly commit him to believing *this*—and he *did* know the other people named by the judge. Karol was distant and diffident, Eveline haughty and high-handed, but Silas and Mary had been . . . everything he required of them. Surely it was unimaginable that they could have done what they now stood accused of doing?

The image cut back to the courtroom, but the moment Damon heard Silas Arnett speak he knew that time had elapsed. A section had been cut from the tape.

"What do you *want* from me?" Arnett hissed, in a voice full of pain and exhaustion. "What the fuck do you *want?*"

It was not the virtual judge who replied this time, although there was no reason to think that the second synthesized voice issued from a different source. "I want to know whose idea it was to launch the great plague," said the figure to Arnett's right. "I want to know where I can find incontrovertible evidence of the extent of the conspiracy. I want to know the names of everyone who was involved. I want to know where Conrad Helier is now, and what name he's using."

"Conrad's dead. *I saw him die!*" Arnett's voice was almost hysterical, but he seemed to making Herculean efforts to control himself.

"No you didn't," said the accusing voice, without the slightest hint of doubt. "Someone switched the DNA-samples so as to fake the identification. Was that you, Dr. Arnett?"

There was no immediate reply. The tape was interrupted again; there was no attempt to conceal the cut. Damon could imagine the sound of Arnett's screams easily enough; only the day before he had listened to poor Lenny Garon recording a tape which it would probably be his privilege to edit and doctor and convert into a peculiar kind of art. . . .

"It was my idea," Silas Arnett said, in a hollow, grating voice. "Mine. I did it. The others never knew. I used them, but they never knew."

"They *all* knew," said the inquisitor firmly.

"No they didn't," Arnett insisted. "They trusted me, absolutely. They never knew. They still don't—the ones who are still alive, that is. I did it on my own. I designed the plague and set it free, so that Conrad could do what he had to do. He never knew that it wasn't natural. He died not knowing. He really did die *not knowing*."

"That's very noble of you," said the other, in a voice dripping with irony. "But it's not true, is it?"

"Yes," said Arnett.

This time, the editor didn't bother to cut out the sound of screaming. Damon shivered, even though he knew that he and everyone else who had managed to download the tape before Interpol deleted it was being manipulated for effect. This was melodrama, not news—but how many people, in today's world, could tell the difference? How many people would be able to say: *It's just some VR pornotape. It doesn't mean a thing.*

Suddenly, Diana Caisson's reaction to the discovery that Damon was using her template as a base for the sex tape he had been commissioned to make didn't seem quite so unreasonable.

The interrogator spoke again. "The truth, Dr. Arnett, is that at least five persons held a secret conference in May 2072, when Conrad Helier laid out his plan for the so-called salvation of the world. The first experiments with the perfected viruses were carried out in the winter of 2075-76, using rats, mice and human tissue-cultures. When one of his collaborators—was it *you*, Dr. Arnett?—asked Conrad Helier whether he had the right to play god his reply was 'The position's vacant. If we don't, who will?' That's the truth, Dr. Arnett, isn't it? Isn't that *exactly* what he said?"

Arnett's reply to that was unexpected. "Who are you?" he asked, his pain seemingly mingled with suspicion. "I know you, don't I? If I saw your real face, I'd recognize it, wouldn't I?"

The answer was equally surprising. "Of course you would," the other said, with transparently false gentleness. "And I know you, Silas Arnett. I know more about you than you can possibly imagine. That's why you can't hide what you know."

At this point, without any warning, the picture cut out. It was replaced by a text display which said:

CONRAD HELIER IS AN ENEMY OF MANKIND

FIND AND IDENTIFY CONRAD HELIER

MORE PROOFS WILL FOLLOW

—OPERATOR 101

Damon stared numbly at the words, which glowed as if they had been written in fire.

When Damon called Madoc Tamlin Diana answered; mercifully, it was only a voice link, so neither of them had to look the other in the eye.

"It's Damon," he said, brusquely. "I need to get a message to Madoc. Tell him I really need that package we discussed. He has to get on to it right away. I've authorised him to draw twice as much cash. I'll fly back tonight or tomorrow, and I really need to know whatever he can dig up as soon as humanly possible. Have you got all that?"

"Of course I've got it," she snapped back. "Do you think I'm stupid or something?"

Damon had to suppress an impulse to react in kind. Instead, he said: "Sorry, Di—I'm a bit wound up. Just ask Madoc to do what he can, and tell him he has extra resources if he needs them, OK?"

By the time he signed off Karol Kachellek had put the other phone receiver down. Damon didn't know who he had been talking to. "I'm sorry Damon," Kachellek said, bluntly. "You were right—this is far worse than I thought. It couldn't have come at a worse time."

"What's it all about, Karol?" Damon asked, quietly. "You do know, don't you?"

"I wish I did. You musn't worry, Damon. It will all be sorted out. I don't know who's doing this, or why, but. . . . " As the the blond man trailed off, Damon stared at him intently, wondering whether the red flush about his brow and neck was significant of anger, anxiety, embarrassment or some combination of all three.

Kachellek reddened more deeply under his gaze. "It's all lies, Damon," he said, awkwardly. "You can't possibly *believe* any of that stuff. They forced Silas to say what he did. We can't even be sure that it really was his voice. It could all have been synthesized."

"It doesn't much matter whether it's lies or not," Damon told him, grimly. "It's going to be talked about the world over. Whoever made that tape is cashing in on the newsworthiness of the Eliminators, using their crazy crusade to ensure maximum publicity for those accusations. The tape-doctor didn't even try to make them sound convincing. He settled for crude melodrama—but that might be effective enough for his purpose, if all he wants is to kick up a scandal. Why put in those last few lines, though? Why take the trouble to include a section of tape whose sole purpose is to establish the possibility that Silas might have known his captor? What are we supposed to infer from that?"

"I don't know," Kachellek said, emphatically and defensively. "I don't understand what's happening."

"Tell me about Surinder Nahal," Damon said, abruptly.

Kachellek still hadn't recovered his usual icy calm. "What about him?" he asked, unhelpfully.

"Come on, Karol, *think*. Silas isn't the only one who's gone missing. Could whoever made that tape be deliberately pointing the finger of suspicion at Nahal?"

"Nahal was a bioengineer back in the old days," Kachellek said. "His field of endeavour overlapped ours to some extent. There was a little bad feeling because he thought he hadn't been given his fair share of credit for establishing the New Reproductive System, but nothing serious. I haven't heard of him in fifty years; I presume that he retired, like Silas. I can't believe that he's responsible for all this. It makes no sense. It must be someone from . . . ."

"Someone from what?" Damon asked, sharply, when Kachellek stopped in mid-sentence again. Kachellek had no intention of finishing, though; he deliberately turned away. Whatever he knew, he wasn't going to state it aloud. Perhaps that was because he was in a room whose walls might easily be host to a dozen eyes and ears, but Damon felt that it was a personal slight aimed at him, a deliberate exclusion.

"Is there any possibility," Damon said, with careful hostility, "that the viruses which caused the plague of sterility really were manufactured, by *someone?* Could the Crash have been deliberately caused?"

Kachellek immediately met his eye again, pugnaciously. "Of course it could," he snapped, as though it ought to have been perfectly obvious. "People don't talk about it nowadays, of course, because it's not considered a fit topic for polite conversation, but the world before the Crash was very different from the one in which you grew up. There were a lot of people prepared to say that the population explosion had to be damped down one way or another—if not by voluntary restraint then by war, famine or plague. Primitive anti-aging technologies had already become available, and it was easy enough to see that things could get very fraught indeed when they became cheaper and more efficient. A lot of mutant viruses were arising naturally—ten billion people crammed into polluted supercities constitute a wonderland of opportunity for virus evolution—and a lot more were being tailored in labs for use as transgenic vectors, pest controllers, so-called beneficial fevers and so on. All kinds of things came out of that cauldron, as many by accident as by design. When the Crash began, speculation that it had been deliberately caused was rife; it wasn't until the Crash had almost run its course that people put that kind of talk aside to concentrate all their attention and energies on the problem of what to *do* about it. This is just a resurrection of ancient and tired rumours, Damon. I don't know whether to be glad or alarmed that there are so few people around who remember the last time they did the rounds. The fact remains that we didn't do it. We're not guilty of any wrongdoing."

Damon knew that Karol Kachellek had been born in 2046; he had been fifteen years younger than Conrad Helier and seven years younger than Silas Arnett. Surinder Nahal must have been much the same age—about thirty years off the current world record for longevity—but the fact that the slanders were old didn't mean that the slanderer had to be equally old. The history of the twenty-first century was all on the Web, easily accessible to anyone who cared to dig.

"Were you actually present when my father died, Karol?" Damon asked, quietly.

"Yes I was. I was by the side of his hospital bed, watching the monitors. His nanomachines were at full stretch, trying to repair the internal damage, but they just weren't up to it. He'd suffered a massive cerebral hemorrhage and there were more complications than I can count. We call ourselves emortals, but we're not really immune to disease and injury, even if we exclude the effects of extreme violence. There are dozens of potential physiological accidents with which the very best internal technology is impotent to deal even today. Kids of your generation, who feel free to take delight in savage violence because its effects are mostly reparable, are stupidly playing with fire. In essence, your father died of a massive stroke—but if the lunatic who made that tape intends to build a case on the seeming implausibility of that cause of death he's barking up the wrong tree. If Conrad had wanted to fake his death, he'd have chosen something far more spectacular."

"How did you know he was dead?" Damon asked.

"I told you," Kachellek replied, with ostentatious patience. "I was watching the monitors. I also watched the doctors trying to resuscitate him. I wasn't actually present at the *post mortem*, but I can assure you that there was no mistake."

Damon didn't press the point. If Conrad Helier had faked his death, Karol Kachellek would surely have been in on the conspiracy, and he was hardly likely to back down now. "I'm going back to L.A. as soon as I can," he said. "Maybe you ought to come with me. The people who took Silas might have designs on you too. The police can offer you far better protection in L.A. than they can in a desolate spot like this."

"I can't go anywhere," Kachellek said, stubbornly. "I've got work to do—*here*."

I have work to do too, Damon thought. *I know what skills it took to put that tape together, technically and in terms of its narrative implications and through Madoc I have access to some first-rate outlaw Webwalkers. I can get to the bottom of this, if I try hard enough, no matter how insistent you are on keeping me out of it.*

The last scheduled flight from Honolulu was due out at nine. Karol Kachellek—who was an important man on Molokai—had no difficulty at all in requisitioning a light aircraft and a pilot to fly it out of Kaunakakai. Damon wasn't in the least flattered that his foster-father took the trouble; he could see how keen Kachellek was to see the back of him.

Damon would rather have sat up front in the cockpit of the plane but he wasn't given the choice. He was ushered into one of the four passenger seats by the pilot, who was a stocky man with greying temples and an Australian accent. Presumably he thought the grey made him look more dignified; he looked to have money enough to have corrected it if he'd wanted to.

"We'll be up and down in no time at all," the pilot told him, before taking his own seat. "Might be a little rough in the wind, though—better keep your belt on."

Damon thought nothing of this instruction to begin with, and he was so deep in thought that ten or twelve minutes had elapsed before he finally took note of the fact that the Sun—which should have been dead ahead of the plane's course—was way over to starboard.

"Hey!" he called to the pilot. "What's our course?"

The pilot made no reply. That was when Damon tested his safety-harness and found that it was locked tight. He called out again, demanding to know what was going on, but the pilot wouldn't even turn around to look at him. He realised, cursing himself for not having done so before, that he was being kidnapped.

Damon's knowledge of the local geography was vague, but he figured that if they were heading south they'd be over Lanai at much the same time that they ought to have been coming down at Honolulu. How many other islands there might be to which they might be headed he had no idea, but there were probably several, and the plane was small enough to land on any kind of strip.

"Was this Karol's idea?" he shouted to the pilot? "Or are you working for someone else entirely?"

He wasn't surprised when there was no reply. He had nothing but his powers of reason to aid him, and he had not enough data to work with. Furious thought merely served to multiply the questions facing him. If Karol Kachellek had instructed the pilot to kidnap him, what motive could he possibly have? Was he trying to hide Damon away, either to keep him from harm or to keep him from asking awkward questions? If the pilot was working under orders from elsewhere, who might be interested in kidnapping him? The people who already held Silas Arnett? If so, why? Did they think he had information which could be used to supplement what they had supposedly winkled out of Silas? Did they intend to force some kind of confession out of him by similar means?

It was difficult to be patient, but in the end there was no alternative. The journey wasn't significantly longer than it should have been but they overflew Lanai and headed for a much smaller island beyond it, dominated by a single volcanic peak. The plane came down just as the Sun had begun to slide beyond the horizon.

When the pilot came back to release Damon from the trick harness he was carrying a gun: a wide-barreled pepper-box calculated to inflict widespread but superficial injuries. Were it to go off, Damon would lose a lot of blood very quickly, but his nanomachines would be able to seal off the wounds without mortal damage being done.

"No need to worry, Mr. Hart," the stout man said. "Nobody means to do you harm. You'll be safe here until carnival's over."

"Safe from whom?" Damon asked. "What exactly is *the carnival?* Who's doing all this?"

He wasn't surprised when he received no answers to any of these questions.

The air outside the plane seemed oppressively humid. Damon allowed himself to be guided across the landing-strip to a jeep parked in the shadow of a thick clump of trees. The man waiting in the driving seat was as short as the pilot but much slimmer and—if appearances could be trusted—much older. His skin was the kind of dark coffee colour that most people who lived in tropical regions preferred. He wasn't carrying a gun.

"I'm sorry about this, Mr. Hart," he said, "but we weren't sure that we could persuade you to come here of your own accord. Until we can get to the people who have Arnett, everyone connected with your family is in danger." To the pilot he said: "You can go now. Take the plane down to Hilo, just in case."

"Who are you?" Damon demanded.

"Get in, Mr. Hart," the old man said. "My name, for what it's worth, is Rajuder Singh. I knew your father and your foster-parents, long ago, but I doubt that any of them ever mentioned my name. Karol Kachellek still keeps in touch."

"Did Karol arrange this?"

"It's for your own protection. Please get in, Mr. Hart."

Damon climbed into the vehicle. The jeep glided into the trees and was soon deep in a ragged forest of thin-boled conifers. The forest was very quiet, after the fashion of artificially-regenerated forests everywhere; the trees, genetically engineered for rapid growth in the unhelpful soil, were not fitted as yet to play host to the rich fauna which ancient natural forests had once entertained. A few tiny insects splashed on the windshield of the jeep as it moved through the gathering night but there was no sound of birdsong. The road was rough and far from straight, but the driver evidently knew it well.

"Did Karol Kachellek instruct the Australian to bring me here?" Damon asked, again.

"Yes he did," Singh said, blandly. "He had to make a decision in a hurry—he didn't expect you to come to Molokai. Our people will bring the situation under control in time, but things have moved a little too fast. I'm afraid that you're in more danger than you know, Mr. Hart—I'll show you why in a few minutes' time."

"Who, exactly, are *our people?*"

Rajuder Singh smiled. "Friends and allies," he said, unhelpfully. "Not many of us left, nowadays—but we keep the faith."

"Conrad Helier's faith?"

"That's right, Mr. Hart. You'd be one of us yourself, I dare say, if you hadn't chosen a different path."

"Are you saying that there's some kind of conspiracy involving my foster-parents? Some kind of grand plan in which you and Karol and Eveline are involved?"

"Just a group of friends and co-workers," the other replied, lightly. "No more than that—but someone seems to be attacking us, and we have to look after our own."

"You think that Surinder Nahal is attacking you?"

"We really don't know—yet. For now, it's necessary to be careful. This is a bad time, but that's presumably why our unknown adversary chose it."

Damon remembered that Karol Kachellek had been equally insistent that this was a bad time. Why, he wondered, was the present moment any worse than any other time?

The twilight was so brief that the stars were shining long before the vehicle reached its destination, which was a sizeable bungalow set in a clearing. Damon was oddly relieved to observe that it was topped by an unusually large satellite-dish; however remote this place might be it was part of the Web; all human civilization was its neighbourhood.

Rajuder Singh showed him into a spacious living-room. When Damon opened his mouth to speak he held up his hand, and swiftly crossed the room to a wall-mounted display-screen. "This is the same netboard which carried Operator 101's earlier messages," he said, while his fingers brought the screen to life.

Damon stared dumbly at the words which appeared there.

CONRAD HELIER IS NOT DEAD
CONRAD HELIER NOW USES
THE NAME DAMON HART

"DAMON HART" IS NAMED AN
ENEMY OF MANKIND
FIND AND DESTROY "DAMON HART"
—OPERATOR 101

"It was dumped shortly before you boarded the plane at Kaunakakai," Singh told Damon, when the import of the words had had time to sink in. "Karol thought you might be inclined to argue if he showed it to you there and then. He seems to think that you always do the opposite of anything he suggests."

Damon could understand why Kachellek might have formed that impression. "It's crazy," he said, referring to the message. "It's completely crazy."

"Yes it is," said the other. "I can't understand why anyone would want to attack you in this way. Can you?"

It occured to Damon that the people he had ordered Madoc Tamlin to investigate might resent the fact—and might possibly be scared that the buying-power of Conrad Helier's inheritance might pose a greater threat to their plan than Interpol or the friends and allies of Conrad Helier himself.

"Unfortunately," Singh observed, "such slanders can sometimes take effect before convincing rebuttals can be assembled. You see why we thought it best to remove you from harm's way. I'm sorry that you've been caught up in all this—it really has nothing to do with you."

"What has it to do with?" Damon asked, his voice taut with frustration. "What are you people up to? Why is this such a bad time for all this to blow up?"

"I can't tell you that," Singh said, with a note of apology in his voice that almost sounded sincere.

"I'll find out anyway," Damon told him—but he was wary enough not to let bravado lead him to give too much away. It might be inadvisable to boast about Madoc Tamlin's capabilities to people who might be just as reluctant to be found out as Operator 101.

The words displayed on Singh's screen suddenly disappeared, to be replaced by an urgently-flashing message which simply said: READ NOW. The system had undoubtedly been programmed with nets set to trawl the cyberspatial sea for items of a particular kind, and one of them had just made contact. "Excuse me," Singh murmured, as he moved to claim his prize.

When Singh touched the console beneath the screen the flashing words were replaced by an image of a man sitting on a perfectly ordinary chair. Damon recognised Silas Arnett. He was not under any obvious restraint, but there was a curious expression in his eyes, and both of his hands were heavily bandaged. He began speaking in a flat monotone.

Damon knew immediately that the image and the voice were both fakes, derived from the kind of template he used routinely in his work.

"The situation was out of hand," the false Arnett said, dully. "All attempts to limit environmental spoliation by legislation had failed, and all hope that the population would stabilize or begin to decline as a result of individual choice was gone. We were still winning the battle to provide enough food for everyone, even though the distribution system left seven or eight billions lacking, but we couldn't cope with the sheer physical *presence* of so many people in the world. Internal technology was developing so rapidly that it was obvious to anyone with half a brain that off-the-shelf emortality was less than a lifetime away, and that it would revolutionize the economics of medicine. Wars over *lebensraum* were being fought on every continent, with all kinds of weapons, including *real* plagues: killing plagues.

"When Conrad first put it to us that what the world needed more desperately than anything else was a full stop to reproduction—an end to the whole question of individual choice in matters of fecundity—nobody said 'No! That's horrible!' We all said 'Yes, of course—but can it be done?' When Conrad said 'There's always a way,' no one challenged him on the grounds of propriety. I couldn't see how we might go about designing a plague of sterility, because there were no appropriate models in nature—how could there be, when the logic of natural selection demands fertility and fecundity? —and I couldn't envisage a plausible physiology, let alone a plausible biochemistry, but Conrad's way of thinking was quite different from mine. Even in those days, all but a few of the genes we claimed to have 'manufactured' were actually the chance products of mutation of extant genes—we had little or no idea how to go about creating genes from scratch to have entirely novel effects—but Conrad had a weird kind of genius for that kind of thing. He *knew* that he could figure out a way.

"I wonder, sometimes, how may other groups must have had conversations very like ours. 'Wouldn't it be great if we could design a virus that would sterilize almost everyone on Earth?' . . . 'Yes, wouldn't it—what a shame there's no place to start.' Was there anywhere in the world in the 2070s where bioengineers gathered where such conversations *didn't* take place? Maybe some of the others took it further; maybe they even followed the same thread of possibility that Conrad pointed out to us. Maybe Conrad wasn't the only one who could have done it, merely the one who hit the target first. I don't know—but I do know that if you'd put that kind of loaded pistol into the hand of any bioengineer of the period the overwhelming probability is that the trigger would have been squeezed.

"We didn't discriminate: we set out to sterilise *everybody*. Everybody in the world. And we succeeded. That's what saved the world; if the population had continued to increase and nanotech emortality had spread like wildfire through a world which was still vomiting babies from billions of wombs, nothing could have restrained the negative Malthusian checks. Famine, war and killing plagues would have run riot. As things were, famine was held at bay, the wars cooled off and the killing plagues were countered one by one. What happened in the last three decades of the twenty-first century wasn't a tragedy at all—but the fact that it was *seen* as a tragedy, and a terrible threat to the future of the species, increased its beneficial effects. The Great Plague was a common enemy, and it created such a sense of common cause, focused on the development of artificial wombs and the securing of adequate supplies of sperms and ova, that for the first time in history the members of the human race were all on the same side.

"We're still living on the legacy of that break in history, in spite of attempts made by madmen like the Eliminators to set us all at one another's throats again. We're still all on the same side, all engaged in the same ongoing quest—and Conrad Helier did that. You have no conception of the debt which the world owes to that man."

"You don't regret what you did, then?" asked a whispery voice from offstage.

"No," said Arnett's simulacrum, dispiritedly. "If you're looking for some sign of repentance, forget it. What we did was necessary, and *right*."

"And yet you've kept it secret all these years. When you were first accused of having done this, you denied it. When you realised that further denial was useless, you attempted to take sole responsibility—not out of pride, but out of a desire to protect your collaborators. The truth had, in the end, to be extracted from you. Why is that, if you aren't ashamed of what you did?"

"Because there are people in the world like *you*. Because the world is overly full of people whose moral horizons are narrow and bleak. For every man who would have understood our reasons, there would have been half a hundred who would have said 'How dare you do this to *me?* How dare you take away *my* freedom of self-determination, even for the good of the world?' Too many people would have seen sterilization as a theft, as a loss of power. Many young people, born into a world of artificial wombs, find it faintly repulsive that women ever had to give birth, but too many members of the older generations still feel that they were robbed, changed without their consent. Karol Kachellek and Eveline Hywood are still doing important work; they never wanted to be sidetracked by the kind of publicity the revelations which you've forced out of me would generate—*will* generate, I suppose."

"What right did you have to make decisions for all mankind?" the second synthetic voice asked, still maintaining its stage-whisper tone. "What right did you have to play God?"

"What gave us the right," Arnett's image replied, the voice as relentlessly dull as it had been throughout, "was our understanding. Conrad had the vision, and the artistry required to develop the means. The responsibility fell to him—you might as well ask what right he had to surrender it to others, given that those others were mostly ill-educated egomaniacs whose principal short-term aim was to slaughter their neighbours. Someone had to be prepared to *take control*, or the world was doomed. When you know that people won't accept the gift of their own salvation, you have only two choices: to force it on them, or leave them to destruction. It was better for the world to be saved—and it was better for the world to believe that it had been saved by a fortunate combination of miracles rather than by means of a conspiracy. Conrad always wanted to do what was best for the world, and keeping our actions secret was simply a continuation of that policy."

"What of the unhappiness caused by the frustration of maternal instinct?" asked the interrogative voice, in a voice devoid of any real indignation. "What of the misery generated by the brutal wrench which you administered to human nature? There are many—and not merely those who survived the Crash—who would argue that ours is now a perverted society, and that the reckless fascination with violence which is increasingly manifest in younger generations is a result of the perversion of human nature occasioned by universal sterilization."

"The empire of nature ended with the development of language," the fake Arnett replied. "Ever since then, human beings have been the product of their technology. All talk of human nature is misguided romantic claptrap. The history of human progress has been the history of our transcendence and suppression of the last vestiges of instinctive behaviour. If there was any maternal instinct left in 2070, its annihilation was a good thing. To blame any present unhappiness or violence on the loss or frustration of any kind of genetic heritage is stupid and ridiculous."

There was an obvious cut at this point. The next thing Arnett's image said was: "Who told you about all this? It can't have been Karol or Eveline. Somebody must have put the pieces together—somebody with expert knowledge and a cunning turn of mind. Who?"

"That's of no importance," the other voice said. "There's only one more matter which needs to be determined, and that's the identity which Conrad Helier adopted after faking his death. We have reason to believe that he reappeared in the world after an interval of some twenty-five years, having undergone extensive reconstructive somatic engineering. We have reason to believe that he now uses the name Damon Hart. Is that true, Dr. Arnett?"

"Yes," said a voice which sounded like Arnett's, ringing false because his head was bowed and his lips hardly moved. "The person who calls himself Damon Hart is really Conrad Helier. It's true."

Damon heard the sound of the helicopter before Silas Arnett's image faded from the screen, and immediately rounded on his companion. Singh had heard it too, and he was seized by sudden alarm. He backed away, and reached for his jacket pocket. He began to say something. The expression on his face suggested that it would be something reassuring, but Damon wasn't about to be reassured. He didn't know for sure whose side Rajuder Singh was on, but he wasn't prepared to take it for granted that it was his own.

Before Singh had any chance to say

what he intended to say or to grip whatever it was he had reached for, Damon was onto him. The blow he aimed with the edge of his right hand was delivered with practised efficiency. The old man went down with a sharp gasp of surprise. Damon pinned him to the floor and put his own hand into the pocket.

He pulled out a tiny dart-gun. It was incapable of inflicting any lethal injury but it could have paralysed him for several minutes before his internal technology mobilised itself to cancel out the effects of whatever toxin the darts bore—long enough for Singh to have made his escape from the house, if that was what he had intended to do.

Singh pried his right hand loose and tried to grab the gun, wailing: "You don't understand!"

Damon lifted the weapon out of his captive's reach but didn't hit him again; he couldn't be sure that the man bore him any ill will. "Damn right I don't," he muttered, through clenched teeth.

The noise of the helicopter was deafening now. It couldn't land because the clearing wasn't big enough but it was hovering close to the house. Damon presumed that it was unshipping men, who would burst in at any moment—but whose men would they be?

"Who are you *really* working for?" Damon demanded of Rajuder Singh, making his voice as harsh as he could. "Tell me now, or I'll cut you up so badly it'll take all the nanotech you've got six weeks and more to put you back together, *old man*."

Singh must have known something of Damon's past, and something of his reputation. His eyes flickered wildly from side to side, as if in search of inspiration. Damon produced the knife he always carried in his boot, for old time's sake. It had a doubly-serrated edge, designed to tear flesh in the ugliest possible way. He stroked Singh's cheek with it, and watched the blood fountain out.

"I can take your eyes out before they get here," Damon said. "And if by chance they aren't the cops, I can do a lot worse."

"It's not what you think!" the slender man gasped, seemingly desperate to spit the words out. "I really am with Karol and your father! Truly I am. If that's the enemy, you have to—"

Damon didn't find out what Singh would have wanted him to do if it had been the enemy—whoever "the enemy" might be—because the windows imploded with a deafening roar and two gas-grenades came bouncing across the carpet, pumping smoke.

"Oh shit," Damon said, lifting his arm reflexively as if to shield his nose and mouth from the fumes. He knew that it would do no good; this wasn't the first time he had been gassed by the cops. He shut his eyes tightly but he knew that it was going to sting horribly anyway, and he wasn't in the least comforted by the thought that the men outside were probably doing it in the hope of saving him from coming to any harm at the hands of his captors.

Bitter experience told him to hold off as long as possible and then to take a good deep breath, but it wasn't easy to persuade his reflexes to fall into line. He suffered several seconds of severe discomfort before he was finally able to let go and fall unconscious.

When Damon woke up he knew by the muted roar of the engines that he was aboard an aeroplane—not some glorified boxkite like the one the Australian had piloted, but a real intercontinental jet. He found that he was stretched out across three seats in the first-class compartment. Hiru Yamanaka was sitting on the opposite side of the aisle, watching him solicitously.

The Interpol man waited politely and patiently for Damon to gather himself together. "I'm sorry about the gas, Mr. Hart," he said, eventually. "We didn't realise that you had the situation under control, and we didn't know who was holding you. When we saw the message that was dumped immediately after your plane took off we feared the worst. Did you see it, by any chance?"

"I saw it," Damon said, sourly. "Have you interrogated Rajuder Singh yet?"

"Not yet. We confirmed his identity easily enough, but he'll be out for a long while. He seems to have had a heart attack. Perhaps you frightened him. His internal technics will pull him through, but they won't let him wake up for a couple of days. Nothing we can do about that without imperilling his life."

Damon accepted a bottle of mineral water from Yamanaka's perennial sidekick, but waved away the offer of plastic-packaged food. He sipped slowly from the neck of the bottle, but didn't immediately raise himself to a sitting position. His head was still aching—but his mind was working well enough to alert him belatedly to the significance of what Yamanaka had said about the message advertising his peril.

"Did you say that the notice naming me was posted *after* the plane took off?" he said, to make sure.

"Almost immediately afterwards. That's why we feared that the two events were linked."

"Singh claimed that it was dumped beforehand—that Karol told the pilot to take me to . . . where was I?"

"Kahoolawe."

"Whatever—that Karol told him to take me there *because* he'd seen the message. If he knew about the message *before* it was dumped . . . ." He stopped abruptly, wondering how best to proceed. One of the legacies of his chequered past was a deep-seated reluctance to tell the cops anything he didn't actually have to, and he still harboured the ambition of getting to the bottom of this before Interpol did.

"That's very interesting," the Interpol man said. "There's no evidence of Singh's involvement with the Eliminators, incidentally, or anyone else of a criminal disposition. In fact, his record is unblemished to a degree that's rather remarkable in such an old man. He's an ecological engineer and has been for well over a century. He knew your father, although that was a long time ago."

"How did you get on to him so

quickly?" Damon asked.

"We were keeping a close watch over *you,* Mr. Hart, even before Operator 101's third message went out. We were already tracking the plane. Did they but know it, Mr. Kachellek and Mr. Singh had no chance of stealing you away unobserved."

Did they but know it, Damon echoed, silently. *The trouble is that it's impossible to figure out how much they do know, and what their real purpose might be.* He knew that it was possible for internal technology to fake medical emergencies as well as taking action to solve them, but he didn't know whether it was unduly paranoid to suspect that Rajuder Singh had done some such thing in order to avoid—or delay—having to answer awkward questions.

"Did you catch the pilot?" Damon asked Yamanaka.

"Alas, no. The plane landed at Hilo on full automatic. He must have bailed out. We're pursuing our investigations on Hawaii and Oahu, but the situation there is very confused because of another incident."

"What incident?" Damon asked, warily.

"An explosion aboard the *Kite*. Rescuers have picked up a dozen survivors so far, but there's no sigh of Karol Kachellek. That's a pity—we'd hoped to ask him a few more questions about this business."

Either the unknown enemy is stepping up the violence of his campaign. Damon thought, *or*.... It wasn't easy to find words to couch the alternative. "You seem to have a talent for losing geneticists," he observed, drily. "Is Eveline still where she's supposed to be, out in L-5?"

"I believe so. For the moment, I'm more concerned with the whereabouts of Silas Arnett and the identity of the persons who have been broadcasting the messages. It may not mean anything, but we've received communications from someone who claims to be the *real* Operator 101, disowning all the recent notices posted under that alias. It's rather difficult to check his story, of course, as he insists on maintaining his anonymity."

"I saw a tape of Silas's supposed confession," Damon said. "It wasn't him, you know—the whole thing was a fake worked up from a template. It wasn't even a particularly slick job. I could have done it better. In fact—"

He stopped, not wanting to put ideas into Yamanaka's head—but they were already there.

"In fact," the Interpol man said, smoothly, "it was a painfully obvious fake, especially at the end. Which raises interesting questions about the whole series of broadcasts. If they're *supposed* to look like fakes, what are we being tempted to believe, and why? Given that it's been made so very obvious that this whole case is trumped up, might we not consider it more seriously than we would had it been more expertly compiled?"

Yamanaka didn't mention the possibility—which had occurred to Damon while he watched the last tape—that the various messages had been put out from more than one source: that the third and fourth had been put out with the intention of discrediting the first and second by piling up lies and confusions. The fact that the man from Interpol didn't mention it didn't mean, however, that he wasn't aware of it; he had used the plural when talking about *persons* who had put out the messages.

"What did your DNA analyses tell you?" Damon asked, gruffly, as he sat up gingerly, touching his fingertips to his forehead. "You must have the results by now—and I'll bet you weren't content with superficial tissues, either. You probably drained some spinal fluid, maybe even bone marrow. What's the verdict? Am I my father, or my father's son?"

"We're completely satisfied that you're not Conrad Helier," Yamanaka told him, serenely. "If the records can be trusted, you and he have exactly the degree of genetic similarity that would be expected were you father and son. There's some uncertainty, of course, as to whether the data relating to your father's genome has been rigged to give that impression—but that kind of data is routinely filed in so many places that it would have been exceedingly difficult to alter them all. We also have a detailed record of your childhood and adolescence—it would have taken a great deal of effort to fake all that."

"It's not faked," Damon assured the policemen. "I remember it quite clearly. I didn't spring into the world full-grown. In this instance, the transparent lie really is just a transparent lie, not a cunningly-wrought truth."

"I assume, then, that we must construe it as a provocative move of some kind," Yamanaka said, evenly. "It may have been intended to startle a reaction from someone. Perhaps your kidnapping was that reaction—but it's also possible, I suppose, that it was part of the provocative move. What do you think, Mr. Hart?"

"What I think," Damon said, "is that your coming to my apartment in person was a provocative move on *your* part. You wanted to set me off, didn't you? I suppose you're delighted with the success of your strategy—I wasn't involved before, but I'm certainly involved now."

"You credit me with too much cleverness," Yamanaka said, with a modesty that was surely feigned. "I had no idea then whether you were involved or not, and I'm still not sure. I don't now where Karol Kachellek fits in, or Surinder Nahal—or Madoc Tamlin."

"Madoc Tamlin?" Damone echoed, trying to conceal his dismay. Clearly the Interpol man was no fool—but what was he trying to imply now?

"He's been asking a lot of questions," Yamanaka observed. "He's using your money to buy the answers. When you saw the second message you called him and you extended his authorization. You presumably believe that you're pulling his strings —but I have to consider other possibilities too. I have to consider the possibility that *your* strings are being pulled. This is a very convoluted puzzle, Mr. Helier, and Madoc Tamlin has some very convoluted friends."

"So have you, Mr. Yamanaka," Damon countered.

The man from Interpol didn't deny it. Instead, he said: "Dr. Arnett's supposed confession was an interesting statement, wasn't it? Food for thought for everyone—and food which will be all the more eagerly swallowed for being dressed up that way. I dare say that he was right about the effect the Crash had, of bringing people together so that for the first and only time in human history they were all on the same side. The world isn't like that any more, is it? In a way, that's rather a pity, don't you think?"

"Not really," Damon replied. "A world devoid of conflicts would be a very tedious place to live. It's good to know that we might live for a very long time—but it's also good to know that we might not. Without an element of danger, life might easily become insipid." He felt a lot better now, and he was able to sit up.

"I take your point," Yamanaka conceded, graciously, "but you must remember that you and I are young men, who can barely imagine what the world was like before and during the Crash. I wonder, sometimes, how different things might seem to the very old—to men like Rajuder Singh, Surinder Nahal and Karol Kachellek, and women like Eveline Hywood. They might be rather disappointed in the world they made, and the children they produced from their artificial wombs, don't you think? They were hoping to produce a Utopia, but . . . well, no one could convincingly argue that the meek have inherited the world—at least, not yet."

Damon didn't know what Yamanaka might read into any answer he gave, so he prudently gave none at all. *He just wants to use me as a pawn,* he thought. *Maybe I could have stayed out of it, if I hadn't gone to Madoc the minute he alerted me to what was going on, but I'm in now for better or for worse, and I have to play it through—not for Interpol, and not for my father's true blue friends, but myself.*

"Sometimes," Yamanaka added, in the same off-handedly philosophical tone, "I wonder whether *anyone* can inherit the world, now that people who owned it all in the days before the Crash believe that they can live forever. I'm not sure that they'll ever let go of it deliberately . . . and such fighting as they have to do to keep it is mostly amongst themselves."

"My father never owned more than the tiniest slice of the world," he said, awkwardly conscious of the fact that he had said *my father* instead of *Conrad Helier*. "He was never a corporation man."

"Your father remade and reshaped the world by designing the New Reproductive System," Yamanaka replied, softly. "The corporation men who owned it might well have hated him for that, even though he never actually succeeded in toppling their commercial empire. Men of business always fear and despise Utopians. They probably hate him still, almost as much as the Eliminator diehards hate *them*."

"But he's been dead for fifty years," Damon pointed out. "Corporation men wouldn't waste time demonizing the dead."

"His collaborators are still alive," Yamanaka countered. "Or were, until this plague of evil circumstance began."

* * *

When the plane landed in Los Angeles Damon was invited to accompany Hiru Yamanaka and his associate to the local Interpol headquarters, but he declined. Despite stern warnings regarding Interpol's inability to guarantee his safety he insisted on going back to his apartment—and in the end, Yamanaka agreed to take him there.

"The claims made by the so-called real Operator 101 are, of course, receiving a full measure of publicity," the policeman told him. "They have not gone uncontradicted, but would-be assassins might be not inclined to believe the contradictions. You really would be safer in another location."

"You can't take me into custody," Damon said, obstinately. "I haven't done anything wrong. If I thought I needed bodyguards, I could hire some very experienced street-fighters."

"That would be unwise," Yamanaka said, blandly. "My advice is to leave Madoc Tamlin and your former friends out of this. They're essentially unreliable."

Damon had his own views on that particular matter, but he didn't object when Yamanaka's taciturn companion didn't get back into the car when they dropped him outside the capstack.

"Just a precaution," the policeman said, as they rode the elevator to the thirteenth floor. "I won't camp outside your door, but I'll be around."

Damon knew how easy it was to mount eyes and ears in the walls of the corridor, and he didn't doubt that anyone approaching his apartment would be under constant surveillance. Yamanaka hadn't made any false promises about respecting his privacy.

When he'd taken time out to visit the bathroom and order some food from the kitchen Damon stationed himself before the windowscreen. He wasn't unduly surprised or alarmed when Madoc Tamlin's phone insisted that he was unavailable. He half-expected to get the same response from Eveline Hywood, but in fact she answered immediately. She even came on camera, so that the time delay occasioned by the fact their words and gestures had to traverse a quarter of a million miles wouldn't be quite as disconcerting.

"Damon," she said, pleasantly. "It's good to see you. I've been worried about you. Is there any news of Karol or Silas?" She was obviously well informed about what had been going on.

"They haven't been found yet—dead or alive," he told her. "Interpol insists that it's only a matter of time. Do you have any idea what's going on, Evelyn?"

"Someone is evidently intent on blackening your father's name. I can't imagine why. These self-appointed Eliminators seem to be getting completely out of hand. There are none up here, mercifully; L-5 isn't perfect, but it's a haven of perfect sanity compared to Earth."

Damon didn't bother to question her certainty as to whether L-5 was really Eliminator-free. For the moment, he was inclined to the opinion that the aggrieved Operator 101 really was the victim of a pseudonym-hijack and that this whole affair was a struggle between two very different groups.

"Why not, Eveline?" he asked, softly. "What brought your adversaries crawling out of the woodwork *now?*"

"I have no idea," she said. He couldn't tell whether she was lying. "You might be better able to guess than I am. After all, this whole affair is really an attack on you, isn't it?"

It is now, he thought. *But it didn't start that way. That's a deflection, a diversionary tactic, for which my father's so-called friends are at least partly and perhaps wholly responsible.*

"Could it have something to do with this stuff that you and Karol are investigating—these para-DNA lifeforms?" he asked, abruptly. That was the only thing that was happening now, so far as he could judge—the only thing which made it a "bad time."

"How could it?" she asked, frowning. Was she puzzled, he wondered, or annoyed by the accuracy of this guess?

"Karol said there were two possibilities regarding its origins: up and down. He was looking at the bottom of the sea while you're looking for evidence of its arrival from elsewhere in the Solar System. But he seemed to have a third alternative in mind when he said it—and there *is* a third alternative, isn't there?" He knew that he didn't have to spell it out that the third alternative was sideways; Eveline understood well enough what he meant.

"I'm still very worried about you, Damon," Eveline said, scrupulously ignoring his question. "I wish you were safe. I'm sure it will all work out, though, if you only give it time. When they find Silas, he'll put the record straight."

"What about Surinder Nahal?" he asked. "Could he really be the one behind this stupid carnival? Does he really think my father orchestrated the Crash as well as the recovery? Why hasn't he said so before?"

"I don't know, Damon," she said, with exaggerated patience. "It's all lies. You know that."

"Is there going to be a new plague?" he asked, abruptly switching tack again. "Is para-DNA going to throw up something just as nasty as the old meiotic disrupters and chiasmalytics?"

"That's ludicrously melodramatic," she answered, calmly. "So far as we can tell, para-DNA is quite harmless. Organisms of this kind compete for resources with life as we know it, but there's no evidence of any other kind of interaction and it would be surprising if there were. Para-DNA is just something which happened to drift into the biosphere from elsewhere—probably from the outer Solar System. It's fascinating, but it's not dangerous."

"Are you sure it came from the farther reaches of the Solar System?" Damon asked, determined not to let the matter lie.

"Not yet," she answered, equably. "Investigations of this kind take time, and we have to be very careful to have all the data in place before we draw conclusions."

"Yes," Damon said, in a neutral tone which was meant to imply far more than the words could say. "I understand that." He really thought he did. That part, at least, he thought he had figured out.

"Please be careful, Damon," Eveline said. "In spite of our past disagreements, we all love you. We'd really like to have you back one day, when you've got all the nonsense out of your system."

I believe you would, he thought. *In fact, I believe you think you will.* All he said out loud was: "I'll be careful. Don't worry about me. You've got better things to do."

He tried to reach Madoc Tamlin, but he failed. He still didn't read anything sinister into that, until he received an incoming call from Hiru Yamanaka informing him that Diana Caisson had been arrested for questioning about her possible implication in the suspicious death of Surinder Nahal.

At first, Yamanaka refused to let Damon talk to Diana, although he admitted that she had asked repeatedly to see him. The Interpol man also refused to discuss the details of the case which he was supposedly building against her, although he confirmed that she had been captured while fleeing with a companion from a house where Nahal's body had been found, and that the police were still searching for Madoc Tamlin, who had been conclusively identified as the companion in question. It was not until Interpol received confirmation from the Oakland police that the body discovered in the house had been dead for some considerable time before Diana and Madoc Tamlin had arrived there that he relented.

"Will you let her go now?" Damon asked, as he was taken down to the holding cells beneath Interpol's L.A. headquarters.

"I can hold her for a while longer," Yamanaka told him. "I'll charge her with illegal entry if I have to. I'd like to talk to your friend Tamlin before I let her go, if only to cross-check her claim that she doesn't know why they went there. I do wish you hadn't involved Tamlin in this business; it's an unhelpful complication. When you offer money for information you attract all manner of spiders—not just the clever crackers who spend all their real-time poking around the Web but the poisonous ones who prey on anyone and everyone."

"He seems to have located Surinder Nahal before you did," Damon pointed out. "Did he lead you to him, by any chance?"

"No, he didn't," Yamanaka replied, in a faintly offended tone.

"You were acting on information received, weren't you?" Damon guessed. "The people who tipped you off were the ones who got to Nahal before Madoc did. They're one step ahead of all of us, aren't they? Do you have any real idea yet who they are?"

"Some of them are one-time friends of your father's, Mr. Hart," Yamanaka said, perhaps feeling the need to demonstrate once again that he wasn't a fool. "I think they knew that Silas Arnett had been kidnapped before we began looking for him, but that they preferred to try to handle things on their own—just as you did. Independence of thought and action seems to run in the family—and the Eliminators are far from being the only secret society supported and sustained by the Web."

There was no time for further talk; Yamanaka let him into the cell where Interpol was keeping Diana. She seemed to be glad to see him, even though she hadn't forgiven him anything. There was a noticeable tension in their embrace.

"This is crazy," she said. "They must know we didn't kill the guy. We didn't even know the body was there."

"They know you didn't kill him," Damon reassured her. "What on earth possessed you to go there? Why was Madoc fool enough to let you?"

"He asked me to help him," Diana said defensively. "He didn't tell me what he was doing. He just wanted me to talk my way into the place—spin a line to persuade the guy to open his door. It wasn't necessary; the door was open when we got there. We didn't even have time to start stripping data from the guy's systems. The cops must have done that after they picked us up; whatever there was, they've got. Can you get me out, Damon? You owe me that much."

While she talked, Diana moved her hands nervously back and forth. Damon didn't doubt that the walls had eyes which could see every last gesture, but he was fairly sure the patient watchers wouldn't be able to decode the signals she was sending. In a world where any environment might be bugged, people like Madoc Tamlin were careful to develop private codes of communication, known only to their closest friends. Diana clearly wasn't an expert in the use of this one, but she knew enough to spell out a name, repeating it to make sure he got it.

The name she was signing was "Lenny." There was only one Lenny she could mean.

"I'll get you a lawyer," Damon promised. "I don't think they're really interested in pressing charges—they just need an excuse to talk to Madoc for a while. They want to know what he found out, just for curiosity's sake. It'll be OK. You'll be out in no time."

As expected, Yamanaka was waiting for him outside.

"What did you find out?" the policeman inquired, politely.

"Nothing you didn't overhear," Damon assured him, not expecting to be believed. "How are things going at your end?"

"As your girlfriend said, we stripped the data from the systems in the house in Oakland and we're going through it with a fine-toothed comb. It's possible that Arnett was held there, but he's certainly not there now and we can't be sure. The fact that Nahal died in problematic circumstances gives us *carte blanche* to root through everything he left behind—if he is behind this puppetshow, we'll uncover every last detail of it eventually. It's just a matter of time."

Damon was alert enough to note the peculiar circumlocution. "What do you mean, *problematic circumstances?*" he asked. "I thought he'd been murdered."

"According to the medical examiner," Yamanaka said, "he wasn't—not directly, at any rate. He seems to have died of natural causes. The only mystery is why his internal technology didn't prevent it, but it's probable that he was simply too old. We're so used to nanotech magic that we've come to expect miracles which even the cleverest machinery can't deliver."

My father died of natural causes too, Damon thought, *and I dare say that poor Karol will turn up drowned. Rajuder Singh hasn't recovered consciousness yet, and perhaps he never will. If Silas is dead, too, that only leaves Eveline unaccounted for. Except, of course, for me.*

"We live in a very complicated world," Damon said, matching the Interpol's man's oddly irritating philosophical manner. "We're so good at creating virtual realities that we've almost lost the trick of distinguishing appearance from reality. Maybe we expect more of social machinery like Interpol than Interpol can possibly be expected to deliver."

"Are you talking about truth, or justice?" Yamanaka countered.

"Both," said Damon, drily.

When he left Interpol headquarters Damon immediately headed for the most crowded streets in the city. He was reasonably sure that Yamanaka's taciturn companion was still looking out for him, and that he wouldn't be easy to shake off. He bought a new suit of clothes and left the old one behind, just in case Yamanaka had planted any discreet bugs on his person, and he stopped off at a public gym for a shower, just in case there was anything in his hair that shouldn't have been there. His internal technology was good enough to take care of anything that had got under his skin. He looked up Lenny Garon's address on the gym's directory-terminal.

When he left the gym he struck lucky. A software glitch put half the local traffic signals out of action for a full five minutes—time enough to snarl up twenty thousand vehicles and create a jam which would require at least an hour to clear. The pavements jammed up almost as badly as the gridlocked vehicles, and tempers soared all along the line. Damon kept on ducking and dodging until he was certain that he was free and clear of all humanly possible pursuit, and then began the painstaking business of making his way across town without leaving a Webtrack.

"Is it about my tape?" Lenny Garon said, anxiously blinking his one good eye, as he let Damon into his squalid capsule. "Did something go wrong with the mesh?" Tamlin plainly hadn't let him in on any secrets.

"Your tape's fine," Tamlin reassured him, once Damon was safely inside. "Just take a walk, will you? The two of us have something private to discuss. I'll pay you a couple of hundred in rent, but you have to forget you ever saw us, OK?"

The kid was appropriately impressed. "Be my guest," he said. As he disappeared into the corridor, he called back: "I hear you're an enemy of mankind now. Good going."

As the door slid shut behind the boy Damon looked around the room, wondering that people still had to live like this in a world whose population explosion had fizzled out long ago. While the greater part of L.A. slowly rotted down into dust its poorer people still huddled together in neighborhoods of high-rise blocks full of narrow rooms with fold-down beds, kitchens the size of cupboards and even smaller bathrooms. Perhaps people had grown over-accustomed to crowding during the years before the Crash, and now couldn't live without it; that made more sense, in a way, than conventional explanations about buildings needing services and the proximity principles of supply and transport.

"What the hell is happening, Damon?" Tamlin asked, when the door was firmly closed and Lenny Garon's footfalls had died into silence.

"You tell me."

Tamlin shook his head again. "Damned if I know. How bad is the trouble I'm in?"

"Nothing much. They know Nahal was dead before you got there. All you did was find a body. They'd be grateful if it weren't for the fact that somebody else had already tipped them off about it. They still want to talk to you, but they'll be polite."

Tamlin's relief on hearing this news was very evident. "Who killed him?" he asked.

"Nobody. At the very worst, somebody flushed out his internal technology, the way Silas Arnett's kidnappers did. Perhaps it's suppose to look like justice. What did you find out, Madoc?"

"Not much," Tamlin admitted. "The way the spiders are spinning, it *looks* as if this guy Nahal had some kind of grudge against your father and his cronies. Maybe he'd been nursing it for a hundred years, or maybe it's just something that came back to haunt him in his old age. It *looks* as if Nahal had Arnett snatched, and that he put out the Operator 101 stuff himself—although the word is out that he isn't the same guy who built up the Operator 101 name and reputation. He was difficult to trace, but not *too* difficult. I'm sorry about Diana—she wouldn't stay home. You know how she is. I didn't tell her anything."

Damon had taken note of the emphases. "You said *looks?*" he queried.

"That's right," Tamlin confirmed. "I've no proof, but I have this itchy feeling that looks are all there is. Even before I found the door open and the guy lying dead . . . I think it was left all neat and tidy for someone to find—the cops, I guess. I get the impression that somebody's busy clearing up their case for them. Whoever it is, they're cleverer than any people I know, and have more money. That's what I think, anyhow."

"It's what I think too," Damon said. "You warned me when I asked you to help that all the best outlaw Webwalkers were in the pockets of the corps.

I didn't think it was relevant, but it is. All we could ever buy was a slice of the same pie they were feeding the authorities."

Tamlin shook his head, wonderingly. "What's it got to do with the corps?" he asked.

"Nothing, except insofar as the real owners and movers of the corps are hidden. The trouble with a world in which it's difficult to keep secrets is that everyone tries so much harder. The Web is an open book to those who know how to turn its keys, and nanomachinery makes all kinds of unobtrusive eavesdropping as simple as falling off a log—and very, very cheap. There's only one option for anyone who wants to move behind the scenes, and that's to throw up multiple smokescreens. The only way to hide the truth is to dissolve it in an ocean of bluff and double-bluff. You and I wouldn't even be clever enough to figure out who the players in this game might be, if it weren't for the accident of biology that connected me to one of them—and even that would be irrelevant if it hadn't been for the vanity which made my father instruct his trusty hirelings to do everything possible to turn me into a replica modeled on the same template."

"Why did they say you were Conrad Helier? They couldn't possibly expect people to *believe* that."

"They didn't. The third and fourth messages were calculatedly transparent lies, intended to discredit any truth that might have been lurking in the first two. My father's team also wanted to give themselves an excuse for taking me out of the game—or dragging me further into it, on their side rather than the opposition's. They didn't approve of my sending you out digging for information—but they cocked up the abduction because they were in too much of a hurry."

"Are you saying that your father really is alive, and that he really did cause the Crash?"

For a moment, Damon was tempted to tell his friend exactly what he did believe—but only for a moment. When the moment was past he knew that he'd made a crucial decision.

"No," he said, after only the slightest pause. "He's dead all right, and if the viruses which caused the Crash were manufactured; he didn't do it. We just got caught in the crossfire of an old war which should have been laid to rest fifty years ago. It really doesn't matter a damn who wins and who loses. Anyhow, Surinder Nahal has been cast in the role of guilty party, and now he's dead the case will be closed."

"You don't think Nahal did it, do you?" Tamlin said, just to be sure.

"No," Damon said, "I don't think he did. I think my father's friends want to keep the real guilty party out of sight, so that the only files that'll be examined and picked apart will be Nahal's—and those will be very carefully doctored. That way, they can shape the disclosures to suit themselves." That much, he figured, was almost certainly true—but it was only a part of the truth. What the hidden movers wanted to keep hidden was something more significant than the possibility that Conrad Helier had designed and released the viruses which caused the Crash.

"Things could be worse," Tamlin opined—still, apparently, buoyed up by the relief of knowing that Interpol had no particular grudge against him. "At least the bastards are still dying, one by one. Imagine how much worse it'd be if they really could live forever. No matter how far or how fast our generation went, we'd always be one step behind them. It'll all be ours one day, though—we just have to be patient."

Tamlin had always had an uncanny knack of putting his finger on the heart of a problem, although he was perversely prone to misinterpret the significance of what he saw. Damon was about to congratulate him on his cock-eyed perspicacity, with all due irony, but as he opened his mouth he saw Tamlin's expression change to one of horror and alarm. He turned abruptly to see the apartment door sliding noiselessly into its bed.

A long arm, which was certainly not Lenny Garon's, reached around the jamb and lobbed something into the tiny room. It fell at Damon's feet. He had only seen such objects in broadcast VR dramas, but he recognised it immediately as an explosive grenade.

There was nowhere in the room to hide and the door was already sliding shut again. Had Madoc Tamlin been a hero of the self-sacrificing kind he might have tried to bundle Damon along in front of him as he headed for the exit, keeping his own body between his friend and the threat of mortal injury, but he wasn't that kind of hero—and Damon couldn't blame him for it.

What Tamlin actually did was to dive past Damon and hurl himself at the slowly-closing slit which led to relative safety. He didn't make it. He couldn't even get his fingers into the crack before the escape-route was sealed off. The doorway was just as narrow as everything else in the apartment, and the door was very efficient.

Damon watched, dumbly, as Tamlin put his arms over his head and huddled up into a quasi-foetal position, evidently hoping that his internal technology might be good enough to pull him through the effects of the explosion, if only he could make himself a small enough target.

Damon was startled by his own composure as he bent down and picked up the grenade.

"It's not real," he said, after holding it for ten or twelve seconds. "It's a fake."

Tamlin wasn't immediately convinced, but it didn't take him long to realise that he must look incredibly foolish. He slowly unwound, and looked Damon in the face. There was no relief in his expression now, although it would not have been inappropriate.

"What kind of crazy man would throw a fake grenade into a place like this?" he asked, harshly.

"The kind who wanted to deliver a message," Damon replied, dully.

Tamlin looked at the grenade, as if he expected Damon to unscrew the cap and produce a piece of paper

from its hollow interior. "What message?" he asked, as he came slowly to his feet.

"It says: *If we really wanted you dead, you'd be dead,*" he explained, softly. "You don't have to worry about it, Madoc—it's for me."

When Damon got back to his apartment Hiru Yamanaka was waiting for him. He was alone. He was sitting in a chair, looking comfortable, but Damon knew well enough that he must have spent the bulk of the time he'd been there prying, with more ruthless efficiency than Diana had ever contrived. He'd probably found evidence of half a hundred minor misdemeanors, but he would doubtless file them away, at least for the time being.

"That wasn't very wise, Mr. Hart," Yamanaka said. "You could have put yourself in danger."

"If anyone really wanted me dead, I'd be dead," Damon told him.

"Really dead, or only apparently dead?" Yamanaka asked, innocently.

"How's the investigation?" Damon countered.

"All wrapped up," the man from Interpol said. "The evidence was delivered to us on a plate when we stripped the systems in that house up in Oakland. It seems that Surinder Nahal had suffered the fate which so many of our old men fear. His internal technology hadn't been able to maintain his brain to the same standard as his body, and he'd fallen prey to mental illness. Having belatedly conceived a paranoid hatred for his more famous contemporary Conrad Helier, he kidnapped Silas Arnett and employed a mixture of straightforward torture and deceptive videosynthesis to build an entirely false case against the man of whom he was so envious. All the evidence to prove it is now in place. We found Arnett's body, by the way—and what was left of Karol Kachellek's. Arnett seems to have died of injuries inflicted after his internal technology had been flushed out; Kachellek may or may not have drowned before the sharks tore him apart. My investigation wasn't a complete failure, however—we were able to track down the original Operator 101 when she started complaining about the usurpation of her psuedonym. I gather that she's rather looking forward to her day in court, in anticipation of being able to plead the Eliminator cause with all due eloquence before a large video-audience. I do hope the newstapes won't make a martyr of her."

"It's a perverse world we're living in, Mr. Yamanaka," Damon said. "Appearances matter far more than reality. In fact, we've sophisticated our virtual realities to the point where the distinction between appearance and reality has broken down. Each layer of illusion that we penetrate merely reveals another layer of illusion."

"You know that's not true, Mr. Hart," the policeman said. "No matter what practical difficulties people like you and I might encounter in getting to the bottom of things, there really is a bottom. The truth is there, no matter how well-camouflaged it might be. If I didn't believe that, I'd be no use at all as an investigator."

"Are you satisfied that you've

reached the bottom of this business?" Damon asked him, knowing the answer already. "Have you sorted out the truth from the morass of disinformation in which it's submerged?"

"Not yet," Yamanaka replied. "But I won't stop trying. Will you?"

"Did Rajuder Singh ever wake up?" Damon asked.

Yamanaka nodded. "He told us that Karol Kachellek asked him to take care of you because he thought you were in danger, and that he knows no more than that. He says he didn't know that the Operator 101 message naming you didn't go out until after Kachellek had called him. It's probably true, and if it's false we'll never be able to prove it. Do you want him charged with false imprisonment?"

"No. Let the matter rest."

"Is that what you intend to do?" Yamanaka asked, again.

"I should never have hared off on a wild goose chase in the first place," Damon told him. "I guess I must still be unduly sensitive about the matter of my supposed birthright, and I was all strung out because of the business with Diana. But it's all over now. My father's dead, and so are most of my foster-parents. There's only Eveline left, and she's a quarter of a million miles away. Diana won't be coming back. I can get on with my own life now, and that's what I intend to do."

"You're a liar, Mr. Hart," Yamanaka said, with an off-hand calmness which didn't take the sting out of the words. "You know as well as I do that the messages I first brought to your attention weren't just raking over burnt-out embers. They were building up to some other revelation, but then your father's friends stepped in and took over the script, putting their own scapegoat—with a full complement of supplementary evidence—in place of the one the opposition intended to use."

"I suppose they killed him just to make it look good," Damon said, to test the water.

"You know how easy it is to synthesize appearances," the policeman said. "That doesn't just apply to images transmitted over the Web and VR tapes. A first-rate biological engineer can probably fake genetic appearances as easily as a good tape-doctor can fake visual ones. There are far too many bodies in this affair, Mr. Hart—too many dead men whose internal technology ought to have kept them alive but somehow didn't. A *corpus delicti* isn't sufficient evidence of death in a world like ours—a world, where flesh can be manufactured and shaped, where the physical appearances of the living can be modified by somatic engineering and where new identities can be so easily created by throwing bits of data into the chaotic flow of the Webstream."

Damon recalled what Madoc Tamlin had said about things being better than they might be. While the old continued to die, the young still had a chance to inherit the empires of the world—so it was in the interests of the old to maintain that image of the world. It was the interests of the people with the very best internal technology to play down its power—to maintain the idea that what people called immortality wasn't really immortality at all, or even emortality. It was in the interests of the people who owned the corps which owned the world to persuade their would-be heirs that patience was still the cardinal virtue, that their elders were liable to lose their memories and their minds and were still certain to die, in the end. But if all of that were mere appearance and mere illusion, what hope would there be for the impoverished young ambitious to claim a generous slice of the big cake? The Eliminators offered hope of a nasty kind, but Damon knew only too well that it was a false hope, a mere colourful folly. Damon knew—and he was sure he knew it because he was his own man, and not because he was his father's son—that the one and only *real* hope in a world like that was of a very different kind.

"With your help," Yamanaka said, "I might be able to dig a little deeper. You're in a better position to put pressure on Eveline Hywood, and pry into her affairs, than I could ever be. Together, we might be able to penetrate this sham and figure out what the real dispute is all about. My guess is that it's about para-DNA. The people who launched this attack on your father's inner circle intended to expose the fact that it's fake—something cooked up in a lab, just like the viruses that caused the Crash."

"You're dreaming, Mr. Yamanaka," Damon told him equably. "You're living in a virtual reality of your own design. Para-DNA is a product of nature; my guess is that it drifted in from outer space. Anyone who said otherwise would be a liar—an *obvious* liar."

Yamanaka didn't scowl or shrug his shoulders; he just got up from the chair and quietly adjusted his clothing before heading for the door. Damon was expecting a Parthian shot, though, and he wasn't disappointed.

"I'm disappointed in you, Mr. Hart," Yamanaka said, as he let himself out. "I thought that you were really determined to be your own man, and to escape the tentacles of your father's schemes and ideals. I thought that you might at least have a healthy resentment of that trick they pulled in naming you. No matter how many denials are broadcast, you'll never be *entirely* safe from the Eliminators. Don't you resent the fact that they're still manipulating you, even after all these years?"

"You know what people say," Damon countered, unwilling to let the policeman have the last word. He hesitated just long enough to conjure up a quantum of suspense and dramatic tension before adding: "If you can't beat them, join them."

The contact was so long in coming that he had almost stopped expecting it. Months passed: months which he spent in splendid isolation, creating imaginary worlds for anyone and everyone who would pay him to do it, making no discrimination between Madoc Tamlin's black market tapes and those commissioned by legitimate corporations. He didn't bother to keep a close watch on the news; by the time he heard that Eveline Hywood had confirmed that para-DNA was an alien invader carried into the inner Solar System by comets from the Oort Cloud, such excitement as the announcement had generated was already dying down. Nobody tried to call her a liar—no one, at any rate, who could get a hearing from the people who put the newstapes together.

Appropriately enough, the contact, when it finally came, was made in the one place where he thought his privacy really was guaranteed: in an imaginary world he was in the process of building. He was designing a sharespace for use in an adventure game, but it wasn't nearly ready to be opened up for sharing. It was a big commission, requiring him to design the natural phenomena, flora and fauna of a hypothetical alien world orbiting a distant sun, whose visitors might undergo all kinds of vivid adventures, individually or in groups. He had his VR-apparatus hooked up to the Web so that he could decant commercially-available templates for adaptation and integration, but nothing was supposed to be able to come down the cable unless he summoned it. When he realised that there was someone else wandering around in his creation he felt a strange sense of violation which was even more shocking, in its way, than the appearance of the stranger. The appearance was, after all, a mere fiction; although it looked exactly like the pictures he had seen of his late father, it could have been anyone at all.

"Hello, son," the image of Conrad Helier said, softly. "We meet at last." As he spoke he looked around at the multicolored alien jungle and all the vivid insects with which Damon was busy populating it; his gaze seemed slightly disapproving, as if he found it all rather tawdry and inartistic.

Damon couldn't entirely disagree with such a judgment, if it were indeed implied; he had been instructed—in so many words—to paint in gaudy and lushly unnatural colours, to think of Douanier Rousseau rather than Corot or Constable.

"You people really are full of surprises," Damon said, determined to hold his own in what was bound to be a problamatic discussion. "I suppose sophisticated biotechnics and clever nanomachinery are so similar to magic that you've all started behaving like the magicians of legend: jealous, secretive, loving deceit for its own sake."

"Not for its own sake," the other said, with a sorrowful shake of the head. "The opposition are secretive, and fiercely jealous of their secrets, because their power is based in products and profits, patents and petty monopolies. To them, knowledge is capital to be hoarded and guarded, invested at the highest available rates of interest."

"And you're different, I suppose?"

"Yes we are," Conrad Helier retorted, firmly. "Their end is our means. They don't have any long-term objectives except preserving their advantages and maintaining their comforts. They only want to control things because they couldn't bear to *be controlled*. Even though they're effectively immortal, they're still thinking in terms of today and tomorrow. They'll grow out of it, in time—but until they do they're a heavy anchor holding progress back. We're planners and builders. We think in terms of centuries and millennia. We're practising to be masters of evolution, but in the meantime we're trying to be midwives of history. We're not interested in money for its own sake, or power for its own sake. We're interested in what money and power will enable us to *do*."

"And pretending to die was just a career move, I suppose?"

"If you want to put it that way. It wasn't difficult. I simply manufactured a second body—a clone, if you will—complete with all faults, for the benefit of the autopsy. You'd be surprised how easy it is to contrive a simple gypsy switch, even in a hospital, when no one's expecting it."

"And you did the same for Karol Kachellek and Surinder Nahal. What about Silas? Did you manage to get him back in time, or did the opposition really kill him?"

"We got him back. They released him once their pitch had been ruined. That's one good thing about the way the game is being played—nobody fights to the death any more. Emortals tend to be scrupulously careful about that sort of thing."

Damon remembered the fake grenade, and he nodded. "I guess that's progress," he admitted. "It might introduce an element of farce, but it's better to play war-games than fight authentically bloody wars."

"It was no part of our plan to involve you," Conrad Helier's simulacrum said, "but once you'd involved yourself we had to treat you as a player. You do understand that, don't you?"

"I understand," Damon said. "I caught on pretty quickly, didn't I?"

"Yes, you did—quickly enough to make a father proud. Not that you could avoid your destiny forever, of course. No one can. You ought to be able to adapt more readily than most. You are my son, after all."

Damon didn't entirely like the tone of these remarks. Even now, he didn't want to be taken for granted. "Was Silas's supposedly fake confession true?" he asked, abruptly. "Did you design the viruses which caused the Crash?"

"I designed one of them. To this day, I don't know who designed them all, and it's certainly possible that some of them really did arise naturally. We didn't kill anybody, Damon—we just took away the supposed right which people claimed to multiply themselves to the point at which the side-effects of their living destroyed the ecosphere. That statement Silas quoted is perfectly accurate: we *had* to play God, because the position was vacant."

"And you're still doing it—but you have to move in mysterious ways, because you're not unopposed."

"Again, if you want to put it that way—yes. Somebody has to make plans, Damon. Somebody has to ask the big questions. If everybody were prepared to join in, we'd be only too happy to let them—but there are too many people in the world who only value the moment and aren't prepared to think about the more distant consequences of their actions. You understand that very well, I think."

Damon felt a surge of resentment, but he didn't try to contradict the phantom. "You designed para-DNA too, didn't you?" he asked, instead.

"I didn't do it on my own—but it *is* a laboratory product. We think that the Earth needs an alien invader, Damon: an all-purpose alien invader which can turn its hand to all kinds of purposes."

"Why? What's the point?"

"Because we can't afford to export our spirit of adventure to virtual reality, and there's a very real danger that we might do just that—as evidenced by the fact that you and I have to meet like *this* in order to avoid the millions of microscopic eyes with which the real world is dusted. People shouldn't be living in the ruins of the old world contentedly huddling together in the better parts of the old cities and binding themselves ever more tightly to our particular stations in the Web like flies mummified in spidersilk. Nor is it rebellion enough against that kind of a world for the disaffected young to use derelict neighbourhoods as adventure playgrounds where they can carve one another up in meaningless ritual duels. We have to maintain some kind of *movement,* because without movement there'll be no momentum. People have to build and keep on building, to grow and keep on growing. We have to *make progress,* Damon—and if people need a spur to urge them on, I'm more than willing to provide it."

"And para-DNA is your spur. Another plague, like the ones the God of the Old Testament rained down on stubborn Egypt in order to secure the release of His people from captivity." Damon's voice dripped sarcasm.

"It's not nearly as devastating as the slaughter of the first-born," his father's simulacrum pointed out. "Like the viruses which caused the plague, para-DNA is no killer—but it'll be a terrible nuisance. It'll attack the structure of the cities and the structure of the Web; it'll make it impossible for the human race to dig itself a hole and live in manufactured dreams. It won't attack people, and it certainly won't murder people wholesale, but it'll always be *there*: a sinister, creeping presence that will keep on cropping up where it's least expected and where it's least welcome, to remind people that there's nothing—*nothing,* Damon—that can be taken for granted. Long life, the New Reproductive System, the Earth, the Solar System . . . all these things have to be managed, guarded and guided. We ought to be looking towards the *real* alien worlds instead of—or at least as well as—synthesizing comfortable simulacra; my people are just trying to make sure that happens. As I said, it's a long-term plan; nothing melodramatic will happen for a few years, but we couldn't afford to have the plan aborted before we even got it off the ground. We have to keep up appearances for a long time yet. I'm sure you understand that. Why else would you turn down Mr. Yamanaka's tempting offer to turn traitor?"

"Why did the corps try to sabotage the plan?" Damon wanted to know. "It sounds to me as if you'll be stimulating a lot of economic activity."

"The corporations don't like us. They really would prefer it if the meek inherited the Earth. The corporations are only interested in what people *want,* and the more stable and predictable those wants are the better the corporation men like it. We're interested in what people *need,* and that makes us difficult to figure. They don't think of us as competition because we're not aiming for profit and our risk calculations aren't made by accountants, but we're an irritating thorn in their side. They're not about to launch an all-out crusade against us because it wouldn't make economic sense, but they're always prepared to make a small investment in a good spoiling tactic. They probably figure that they've won a tiny victory by forcing a few more of our personnel into effective invisibility, but that goes to show what small-minded cowards they are. In the end, they can't win—because they're not really playing to win—they're only playing for money."

"Playing God must be addictive," Damon observed, neutrally, "but it's only one more game, isn't it? All this talk of yours is just rhetoric—mere appearance."

"When human beings have properly adapted to what we now are," Conrad Helier's image replied, twisting its synthetic lips into a conscientiously ironic smile, "we'll *all* be playing God, because it'll be the only game in town. It's not a position that can be left unfilled—not any more. We have the power and we have the time, so we have to take the responsibility."

"And where do I fit into your grand plan? Or did you only use my name in your patched-up package of disinformation to get back at me for deserting the fold?"

"You decided to be a player, Damon. We had to put you in a position where you couldn't do us any harm, for safety's sake. Anything you say about us from now on is bound to seem suspect—and I can assure you that there'll be no record of this conversation to prove that it ever took place. But if you *want* a place in the scheme, you only have to step aboard. Go out to L-5, Damon—join Eveline and work with her. It's the place to be, nowadays and for the next forty or fifty years. After that . . . anything's possible, Damon. Anything's possible, for you and for anyone, if you can only cultivate the skill and find the drive."

"And that's what you expect of me, isn't it? That's what you've always expected."

"It's a natural next step. You've got the senseless violence out of your system, and you've already shed your links to that particular phase of your past, one by one. There are only two possible futures before you now: either you become a corporation man, building gaudy fantasies like *this* to amuse the meek; or you become a *real* outlaw, and a real inheritor of Earth."

Damon looked his enigmatic visitor squarely in his deceptive eyes, and said: "You're not my father at all, are you? This is just one more phase of the game, one more layer of illusion." He was aware of the desperate edge in his voice, and of the fact that he was being perverse for the sake of it. As Mr. Yamanaka had said, there *was* a truth lurking at the bottom of the swamp of deceits, and in his own mind Damon was morally certain that he had reached that truth. However false this appearance might be, and however absurd its context, he was completely convinced that the voice with which this man was speaking was his father's voice, and that it was speaking as plainly and as honestly as it could.

"Does it really matter who or what I am?" the invader asked, quietly. "The specifics of the case are trivial; what really matters is the one thing that's obvious no matter who's alive and who's dead, not who made what and why. Anything *is* possible, Damon, if you can only figure out what you want to do. If you want to, you can hide out in virtual space all your life; a lot of people will, now that the option's there. If you'd rather be a man than a rabbit, though, don't be ashamed of trying to play God in earnest, *because there really isn't any other game worth playing."*

"I don't owe you anything," Damon said, equally quietly. "Whoever you are, or pretend to be, I don't owe you anything. I'm my own man."

"You owe it to yourself to be and do everything you can," said the person wearing Conrad Helier's face. "Some day you will. All I'm asking you to do is to start now instead of leaving it until the day after tomorrow."

With that, Conrad Helier's simulacrum turned and walked away into the imaginary wilderness—into an unreasonably vivid forest like none that had ever been seen on the face of the Earth. Brightly-coloured insects fluttered into the virtual space he had vacated, impossibly pretty and precious. A semi-human dryad stepped out of the bole of one of the trees, blinking in the sudden sunlight. She wore Diana Caisson's face, but there was nothing of the real Diana in her make-up; she was only a phantom, like the insects and the trees.

Like the invader before her, the dryad soon disappeared into a riot of colour and confusion—but Damon knew before then that whatever he chose to do today and tomorrow, he would never be rid of the challenge that had been set before him. As his father had said, the only thing to be decided was when he would begin. ■

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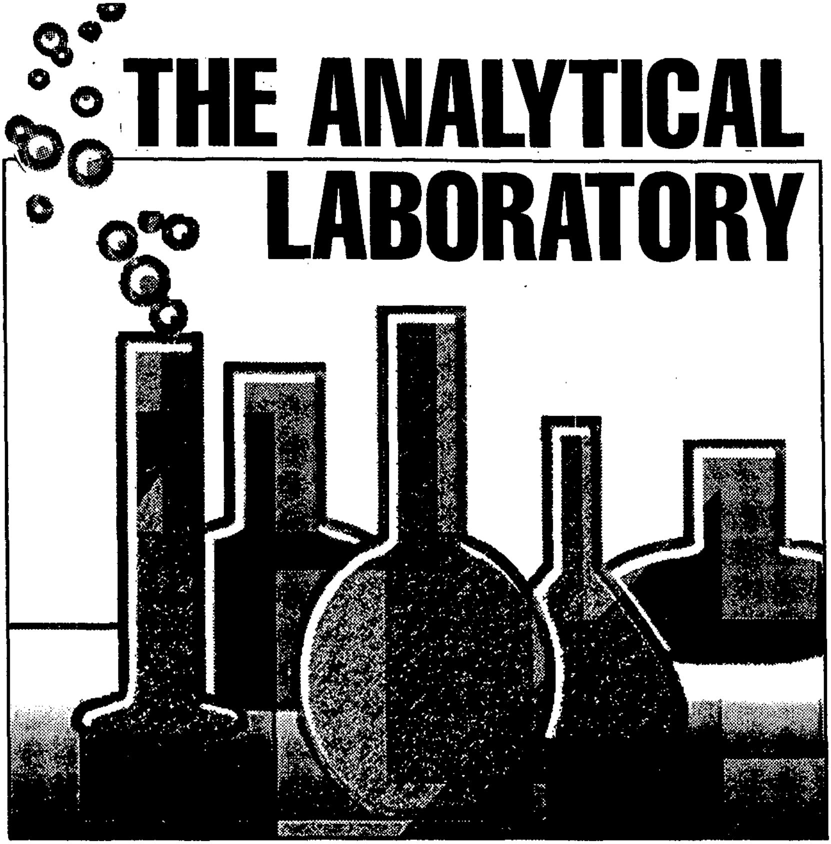
THE ANALYTICAL LABORATORY



Once again we'd like to thank all who voted in our annual poll on the previous year's issues—your most meaningful way to convey appreciation and positive reinforcement to the authors and artists who do an especially good job of entertaining you. Your votes help you by giving us a better feel for what you like and don't like—which helps us know what to offer you in the future. They help your favorite writers and artists by rewarding them directly and concretely for outstanding work.

We have four categories: novellas and novelettes (grouped together), short stories, fact articles, and covers. In each category, we asked you to list your three favorite items, in descending order of preference. Each first place vote counts as three points, second place two, and third place one. The total number of points for each item is divided by the maximum it could have received (if everybody had ranked it #1) and multiplied by 10. The result is the score listed below, on a scale of 0 (nobody voted for it) to 10 (everybody ranked it first). In practice, scores run lower in categories with many entries than in those with a few. For comparison, the number in parentheses at the head of each category is the score every item would have received had all been equally popular.

NOVELLAS AND NOVELETTES 0.61

1. "Melodies of the Heart," Michael F. Flynn 2.68
2. "Symphony for Skyfall," Rick Cook & Peter L. Manly 1.97
3. "Song From a Broken Instrument," Stephen L. Burns 1.93
4. "Karl's Marine and Spacecraft Repair," G. David Nordley 1.28
5. "Evolution," Grey Rollins 0.97

SHORT STORIES 0.63

1. "Bubba Pritchert and the Space Aliens," Bud Webster 1.52
2. "His Father's Voice," G. David Nordley 1.50
3. "Negative Feedback," Christopher Anvil 1.23
4. "Persistence," Bud Sparhawk 1.17
5. "The Pandora Probe," Jerry Oltion 0.91

FACT ARTICLES 1.33

1. "The Rooster Crows at White Sands," G. Harry Stine 3.92
2. "The Bug, the Mouse, and Chapter 24," Charles S. Harness 2.09
3. "Return to the Moon," Buzz Aldrin (with Aleta Jackson) 1.64
4. "How to Find A Starship," Robert Zubrin 1.58
5. "Multiple Comet Strikes on Jupiter," Peter L. Manly 1.58

COVERS 1.54

1. March (for "Waterworld"): Bob Eggleton 3.45
2. May: George H. Krauter 2.98
3. September (for "Hurricane!"): John Maggard 2.10
4. October (for *Starmind,* Part 3): Chris Moore 1.81
5. December: Wojtek Siudmak 1.77

Most categories this year had clear winners with sizable margins, the most dramatic being G. Harry Stine's fact article "The Rooster Crows at White Sands," which was mentioned on almost half of all ballots in this class. Short stories came very close to a tie, with *Analog* newcomer Bud Webster narrowly beating out a well-established favorite, G. David Nordley. Nordley, who placed first in novellas and novelettes two years in a row, came close to making it three straight with his almost-first in this year's short stories.

The number of votes received was gratifyingly up this year; we hope to make it larger next year by more actively encouraging you to vote by e-mail if you prefer. We'd also like to reduce the number of votes wasted by being cast in the wrong category. The magazine clearly indicates what category every item is counted in, and votes cast for it in any other category simply can't be counted.

Claire Anderson, of **Waltham, Massachusetts,** is this year's winner of a free one-year subscription in a random drawing from all ballots received. Next year that could be you—and the more votes we have, the more the results mean!

Jerry Oltion

FAIT ACCOMPLI

One of the biggest problems of a remote research outpost is equipment maintenance—which means more and requires more imagination than you might think!

Illustration by Janet Aulisio

I woke for the 146th morning to the sound of wind. Even so it took a minute to place myself. I wavered on the border between sleep and wakefulness, unsure which sensations to choose as real. In the confusion that comes with waking I couldn't decide if my Universe was the one where wind shrieked and whistled overhead without a break, of if mine was the one where beautiful women aged eighty years in my arms. They seemed to blend together at times, the wind becoming the labored breathing of the dying woman, or the woman lifting up and blowing away through the walls.

I rubbed my eyes and broke the moment. The withered crone that had been Roxanne evaporated away. The wind grew stronger.

I had been on Glacia for nearly six months by Earth's calendar, and in that time the wind had never once let up. I heard it roaring every moment of my waking day. My shelter, an insulated dome anchored to the slow-moving ice, muffled the sound to a distant rumble, but the walls couldn't block it out completely. I had grown used to it, but it was always there. Only in my sleep could I find escape from the wind, but other torments awaited me there. Wind and dreams, mortar and pestle for my sanity.

The wind: it starts as a mass of air cooling over the pole. Convection brings it in from warmer climes to gather in a high-pressure cell over the north polar plateau, where it slowly loses its heat to space and falls. The air that comes in contact with the ice cools still further, but since it can't fall it spreads out, still cooling, pushed by the descending air behind it until it crosses the hundreds of kilometers of plateau and runs up against the mountain range that separates the plateau from the basins beyond. The mountains are nearly buried in ice; momentum and pressure force the cold air through passes and over ridges to fall again down the glacier-filled canyons beyond and pour out into the basin, accelerating all the way. By the time it reaches weather station Delta—1500 kilometers from the pole—it's doing at least a hundred kilometers an hour, and it hits like the blast of a rocket engine.

The dreams: Blonde hair in a frenzy of tight curls, framing a face with soft cheekbones, wide-set green eyes and a narrow, high nose above a mouth that always carried a hint of a smile. Roxanne. She was half a head shorter than me, and slender. I could slip one arm completely around her, but when I tried it in my dreams she would change. Her hair would gray and her eyes would lose their gleam and her smooth skin would wrinkle and hang in folds. The closer I held her the older she grew, until she was nothing but skin covering a loose frame of bones, peering out at me through eyes sunk deep in their sockets. And then she would speak.

Her voice was the same voice I knew, the voice of a woman in her mid-twenties. From that time-battered frame, the voice of youth would ask, "Do you still love me, Tony? Do you still love me?"

My analyst said I did. I quit talking

to it after that, not because it was wrong so much as because it was obviously malfunctioning. A good counselor never tells you how you feel; it lets you discover that for yourself. So I kept myself sane without its help, spending my time reading, watching movies, listening to music, and maintaining the weather instruments.

I wasted little of my conscious time thinking about Roxanne. Riding a starship that traveled at almost the speed of light, I had put forty light-years of space and eighty years of time between us (for it's a two-way trip), and if there'd been a planet farther out that would have taken me I'd have gone. Relativity kept me from aging during the trip; more distance merely meant more time gone, which was fine with me. I didn't want to see Roxanne or even think of her again. After our divorce I'd sold everything she didn't take with her, signed on with the World Restoration League, and jumped ship for Glacia, where I'd hoped to lose myself in the fascination of studying an ice age in progress.

I should have read the brochure. Meteorologists on Earth did all the studying; I was there to collect data. Actually I was there for less than that. The weather station collected the data automatically, but under the extreme conditions found on Glacia even the sturdiest equipment breaks down occasionally. I was the repair person. I functioned in my official capacity maybe once a month,. usually when a piece of flying ice smashed one of the sensors. Then, for an hour or two, I would glory in a sense of purpose as I fought with the wind and the clumsy gloves of my environment suit, holding onto a safety rope all the time to keep from being blown away while I fixed the damaged instrument. Two hours of work every twenty or thirty days, and Glacia's days were thirty hours long.

At that, I paid my way. There were only seven weather stations on Glacia, and each one was worth more to the people on Earth than it cost them to keep it manned. They were fighting their own ice age there, and the information we collected helped them to better understand what they were up against. Glacia had done what we were afraid Earth would do this time: frozen all the way to the equator, its once-temperate climate locked beneath a sheet of ice that would endure for millennia, if not forever.

Glacia wasn't the only study planet. Explorers had discovered dozens of Earth-like worlds that had died in dozens of different ways, and we studied each of them to learn what not to do with Earth. A steady stream of survey ships coasted in an immense loop between star systems, collecting data, resupplying the stations, and rotating personnel from job to job so they wouldn't grow overly bored or go crazy from the isolation.

So I wasn't surprised when the radio buzzed for attention on the morning of day 146. I'd been expecting it for a couple of days by then, trying not to dwell on it and succeeding only when I slept. The supply ship had come, and I was getting out of there. Six months earlier than I'd contracted for, but I didn't think I'd have any trouble convincing the people in charge that I was due for replacement.

I had set the radio in the middle of the dome where I could reach it from practically anywhere. When it buzzed I leaned over from the table/desk beneath the dome's only window and picked up the receiver, a narrow-band blind set, and said, "Delta station, Stratton here." My voice was gravelly from disuse; I'd given up talking to myself except in emergencies.

A woman's voice said, "Hello down there. This is Elizabeth Duvall, commanding the starship *Nereid*. What is your condition?"

"Well, I've got good news and bad news," I told her.

"Oh?" She didn't sound amused.

I didn't particularly care. I said, "The good news is, the station's fully functional."

After a pause, she finally asked, "And the bad news?"

"The bad news is, I'm not so sure about me."

Her tone changed instantly from annoyed to concerned. "What's the matter? Do you have a medical emergency?"

I laughed. "No, no. But I think I might before the next six months are up. I want to be rotated out of here this time instead of next."

There was a considerably longer pause than before.

"What's the matter?" I asked, suddenly sweating. The dome seemed to constrict around me. "You do have a contingency plan for this, don't you?"

Duvall hummed thoughtfully. "Oh yes, of course. If you really need replacement, we can do so. Of course our counselor will want to discuss it with you. Could you transmit your analysis program records so she can prepare for the meeting?"

"I quit using it three months ago," I told her.

"I see." Pause. "Well, send us what you have, and we'll send her down for a personal interview after she's had a chance to look it over; but if you don't mind the wait, we'll schedule your shuttle last so we don't hold up the other stations' supplies."

"Sure, sure, I can handle it," I said. "As long as I know it's temporary."

"Fine."

I linked the computer to the radio and transmitted the files. I expected Duvall to sign off as soon as she received them, but when the bleeps and twitters of computers talking had finished, she said, "Have you heard from station Alpha recently?"

Alpha. That was Ed Lawrence, at the north pole. "No," I answered. "Not for a couple of weeks. Why?"

"We can't reach him by radio."

"Not surprising," I said. "We don't talk much between us down here, and he's quiet even by our standards. He probably just switched it off."

"We get an automatic response to our coded signal," she said. "The radio works, but Lawrence won't answer. Or can't answer."

I looked around the dome. Six meters across, two and a half high, and most of that filled with equipment and supplies. Could I ignore a radio call in a space this small? Not likely. "What's the status of his station?" I asked.

"Operational," Duvall answered. "We get continuous input from all the instruments except temperature. The last reading for that shows minus sixty, dated spring, uh, fifty-third."

"We just have four months here," I explained. "Spring fifty-third would have been—" I checked the X'ed-out calendar on my desk "—ten days ago. He's dead then."

My certainty surprised her. "How can you know that?"

"Because when something breaks in a station, you rejoice," I said. "You've got something to do. You don't necessarily hurry, but you do go out and fix it. If Lawrence hasn't fixed his station in ten days, it's because he's not alive to do it."

"Perhaps he's only sick."

"Ten days is a long time to be sick. Especially sick enough to keep you from fixing a thermometer." I thought a moment, then asked, "What were the readings just before it went out?"

I waited for Captain Duvall to pull the information out of her computer. "Fluctuating around minus forty until two days before the malfunction, then dropping steadily to minus sixty for a day, then nothing. Why do you ask?"

"Look at barometric pressure and snow depth to be sure," I said, "but I'll bet it was storming. You don't know what that means until you've seen it first hand, but it looks like Lawrence went out in it to fix the thermometer and got lost."

Duvall said, "That does seem to be the logical explanation. Poor soul. He was due to come back this trip, too."

I nodded, a useless gesture over the radio. "Yeah, too bad, but I pity his replacement more, especially if he's got a vivid imagination."

"Oh?"

"Ghosts, Captain," I said. "They're bugging me every night, and mine came from forty light-years away. I don't even want to think what it'd be like living alone for six months in a dome where somebody died."

"I'll, uh, have the counselor discuss it with her," said Duvall. "In the meantime, prepare for your own visit. By the counselor, I mean."

I grinned. "Right."

"Duvall out."

I set the receiver back in its cradle. Lawrence was dead, huh? I felt a moment of sorrow at his loss, but I'd meant what I told Duvall. His replacement was in for a rough time.

I was packing my clothes a few hours later when the radio buzzed again. I expected it to be the shrink, but it turned out to be Duvall again. "I've got bad news," she said without preamble.

"You found Lawrence."

"We didn't get that far. The shuttle was on its way down when the attitude control rockets failed. It crash-landed about three hundred kilometers from station Alpha, along meridian one-twenty. There is at least one survivor."

"What do you mean, 'at least'?"

"We can't make radio contact, but someone set off the emergency beacon."

"I thought those went off by themselves in a crash."

"This was evidently too soft an impact for it," Duvall said. "The transporter didn't start broadcasting until ten minutes after the shuttle went down. Someone had to have triggered it manually."

"Oh. So why are you calling me?"

"Because we don't have another shuttle ready for flight. It'll take us at least a week to assemble one, and by that time, if the survivors are injured, they could die." Duvall sounded exasperated. I could tell she thought I was an incompetent boob and a pain in the ass to boot, and she wouldn't have been talking to me unless she had to.

"You want me to go after them," I said. "What, twelve hundred kilometers or so over the ice?"

"You've got a crawler, don't you?" she asked.

"Yeah, sure," I said. "All the stations do, so we can reach our remote instruments, but I've never gone more than a hundred kilometers in mine and that's on level ice. There's a mountain range between here and there. I'd have to climb a moving glacier and hope there's a pass or something at the top leading onto the polar ice sheet."

"We can map a way for you from orbit."

"Can you keep me from falling into a crevasse?"

"I thought you had radar for that."

She had me there. The crawlers *did* have radar that would supposedly spot voids in the ice. I just didn't want to trust my life to it. I guessed I was about to give it a try, though. Meridian one-twenty ran to the east of me by about fifteen degrees, but that still put the downed shuttle closer to me than anyone else. Damn. Here I was within a day or two of getting the hell off this dirty iceball of a planet, and now duty and honor were sending me off to get myself killed.

"What about storms?" I asked. "I'm not driving through a blizzard."

She sighed again, and I could tell what she was thinking. A weather monitor who didn't even keep track of the weather. Well, screw her; I kept the damned instruments running.

"The closest frontal system is four days west of you," she said, and the silence grew while she waited for my answer. We both knew what it had to be.

"All right, all right, I'll go," I said. "But I want the widest, smoothest path between here and there, even if it takes me out of the way a little. The object is to get there in one piece, not play hero along the way."

Duvall's smile was almost audible. "We'll get to work on it."

"Good. Dump it into my computer when you get it; I'll be outside getting the crawler ready."

"Right. Duvall out."

I left the radio on and made a circuit of the dome, tossing my medical console, some extra clothing, food, and anything else I could think of into boxes for the trip. The crawler would make about sixty kilometers an hour on the level, which would get me to the crash site in less than a day if it was all flat. I could count on maybe half of it being so, but the other half was going to be the trick. I packed for three weeks, and wondered if I'd go hungry before I got back.

After I'd stacked all my boxes of stuff by the door I pulled on my environment suit, a thick, heavily insulated overall—complete with sealed helmet—that felt like a construction worker's spacesuit. It didn't have air tanks, but the heater still made a clumsy bulge at my side. I tried not to knock it on the wall as I pried the outer door open.

It opened to the southeast, on the leeward side of the station. The wind whipped around in eddies, blowing loosened ice inside and howling around the edges of the door. I took a cautious step out. The sun blinded me for a moment; it was still late morning. Good. This time of year I would still have fourteen or fifteen hours of light for traveling, maybe more if I made it far enough north. After the artificial light in the dome the sun looked like an orange spotlight in the sky, but I knew I'd get used to the color soon enough.

I could see for kilometers. Scarps and crags stuck out in such sharp outline that I had trouble judging their distance; they all seemed too close. Though the entire atmosphere was rushing past at gale force, I could detect no motion on the ice. Nothing was left for the wind to move. Loose snow would sublime in less than a kilometer; any that hadn't drifted solid in the last storm was gone by now. Occasionally the wind would wear away a chunk of ice and sent it flying, but that was rare.

I made my way to the crawler, only a few meters away on the right. It was designed for Glacia: low and wide and heavy. Not particularly fast, but it wouldn't blow over in the wind. I'd learned to park it beside the dome instead of in the lee of it; the first time I'd done that I'd had to dig a tunnel through the drift that had formed between them. I held onto the guide rope while I chipped the door free with my hand axe, then pulled myself inside. The power plant took a few minutes to warm up, so I busied myself with a thorough inspection of the controls and gauges.

They were simple enough. Throttle and steering were both in one T-bar beside the driver's seat, and the gauges and radar and gyrocompass and stuff were scattered across the dash in front. A thick jesus bar looped out of the dash as well, and the door held another. The roof was thickly padded, but that was overkill; if the ride got bumpy I had a full chest and lap harness I could wear.

When the idiot light told me the power plant was ready, I nudged the T-handle forward a notch. I could hear ice cracking over the roar of the wind as the crawler strained for a moment, then it lurched ahead with a shudder that made me grab for the jesus bar. I steadied myself and tried a gradual curve to the right.

It took me a few minutes to gain enough confidence to drive it back next to the station. The crawler had more than enough power to level the dome if I steered wrong, but I finally got it parked in the lee of the bubble and opened the door. Mistake. The crawler had upset the airflow; a gust of wind ripped the door out of my hand and plastered it against the side of the cab, nearly pulling me out with it. I crept carefully down and took one step to the station door, fighting to stay upright. How was I going to get all my food and equipment across there?

I settled for throwing it. The wind was in my favor going that way, and nothing was fragile.

Back inside the station I downloaded the maps the *Nereid* had sent me from the main computer into my pocket comp, then printed out hard copies just in case. It looked like they'd found a low pass where the ice from the polar plateau had broken through the mountains and joined smoothly with the lower basin. What looked smooth from orbit could be anything on the ground, but it was probably the best chance I had of finding a driveable route.

Despite my misgivings about the trip, I felt a shiver of excitement as I closed the station's door from the outside. Even an hour of activity with a purpose had pumped some of my normal liveliness back into me. Was this all I needed? A little excitement?

No. I shivered with an entirely different emotion at the thought of another six months here, even if I were to get out and take a drive every day. I'd do this one last job, but then I was out of here.

I laughed when I realized I was looking for a way to lock the door. There wasn't a single lock on all of Glacia. Who would you lock out? No one came knocking but the wind and the dreams, and neither of them used the door.

I dumped the maps into the navigation computer, then turned on the radar and set it to scanning for obstacles and fractures in the ice while I found north on the compass and fed power to the tracks. The crawler surged ahead, accelerating quickly up to cruising speed. The ice pack was pretty smooth here; I felt only the vibration of the treads and the occasional shift from side to side as I steered around bumps and depressions.

As soon as I settled in to the rhythm of driving, I called the *Nereid.* I could barely hear the radio through the shriek of the wind, until I plugged my helmet set into the crawler's. Then radio and wind were about the same volume.

Captain Duvall was busy. A junior officer answered my call, and when I asked about the shuttle he said, "No more activity. It still radiates in the infrared, so we can assume the lifesystem still works. Beyond that we can only hope."

"Yeah." Spaceship crashes don't leave much behind, and though an orbit-to-ground shuttle isn't exactly a spaceship it still must have been moving at a hell of a clip when it hit the ice. Not hard enough to trigger the beacon, though, I reminded myself. Maybe it wouldn't be that bad.

"Any changes to my route yet?" I asked. Presumably they were still examining the terrain from orbit for the best path.

"Nothing yet," he said. "We'll call you if we come up with any."

"Right."

It became obvious pretty quick that we didn't have a whole lot more to say to each other, and I was afraid if I stayed on the radio I'd wind up talking with the shrink, so I signed off, settled back in my seat and readied myself for a long stretch of driving.

After a while I found myself thinking about Earth. I'd been so wrapped up in my own problems that I hadn't even asked for news. I wondered if the glaciers had covered Canada yet, or if any of our work here had helped slow their advance.

But the *Nereid's* crew wouldn't know that any more than I did. They had left only six months later than me, after all. The only news of any value they could carry would be personal messages, now long out of date, but evidently no one had sent me any. That alone told me plenty.

I allowed myself to wonder what Roxanne would be doing now. She'd be forty years older than me, less the year difference in our birth dates. She had probably moved in with that jerk Holland or Hammond or whatever his name was. But would she have stayed with him? I doubted it. Up until I caught her in the sack with him I thought she was the most faithful companion a person could ask for, but now? What would keep her from doing it again in a few years?

I realized I was getting hot about it all over again, and got mad about *that*. It was old news, let it go. Roxanne had stepped out on me, and I had stepped out in return. End of marriage, end of subject.

Most of my friends misunderstood my reaction to finding her in bed with another man. They assumed I was living under second millennium moral standards, that I was jealous, and the fact that we'd married in the first place was proof enough to them. Marriage was an old custom, outdated in a modern society. They didn't seem to remember that she'd married me, too. In their eyes she had done nothing wrong; it was me and my overreaction that bore the fault. They couldn't understand that I was reacting to the lie, to the sudden realization that my whole life had been built around the false assumption that she loved me.

I still didn't understand why she did it. She had given me no warning, no indication she was even thinking about another man. Things were going well. We'd just moved up to the Moon, where I'd taken a job with a new computer manufacturing company. Roxanne hadn't found work yet, but she wasn't really looking. I made more than enough to support us, and I told her to relax, to enjoy life for a while.

She claimed boredom after I caught them. Waiting in the apartment for me to come home, waiting for me when I had to go to Earth for sales meetings, always waiting but never doing anything on her own anymore.

I didn't care why she'd done it. Just knowing she *had* was sufficient. She didn't love me; she couldn't have. And suddenly I didn't love her either. I filed for divorce, and within a week of the decree I'd left for Glacia.

The constant vibration of the treads and whistling of the wind lulled me into a trance. I kept the throttle full ahead and the power balanced to both tracks unless the compass or the radar warning forced me to change my course. I couldn't have guessed how long I'd been at it, but the sun had moved around behind me by the time the radio crackled to life again. I heard a few tentative squeals and crackles, then a faint voice covered by static said, "Hello. . . starship *Nereid* . . . is Saskia . . . ish. Do you . . . *Nereid*?"

It was hard to tell with the interference, but the voice sounded female. We had a couple of women on the planet already, but none named Saskia. Was that the shuttle pilot calling? Or Lawrence's replacement? I waited for someone on the starship to reply, but after a few seconds it became apparent that they weren't going to. Evidently her signal was too weak to trigger the communication satellites in synchronous orbit, and the starship was out of range as well. Which meant I was hearing her directly, via ionospheric skip. That might not last long.

I flipped my two-way switch and said, "This is Tony Stratton. Evidently the ship can't hear you, but I'm headed toward you on the surface. Do you copy?"

I heard only the wind for a long moment, then just as I was about to call again she answered. Static kept washing out her signal, but I heard her say, "Thank God it's . . . wasn't sure I'd fixed it right . . . crash. The pilot's . . . don't think I can fix the shuttle, and I sure as . . . fly it. Where are you?"

"I'm about six hundred kilometers or so south of you. Are you hurt?"

Her voice was softer than the wind. Even with the volume turned up all the way I could barely hear her through the buffeting and the static. ". . . got bounced around a little . . . nothing broken. The pilot's got a bad gash on his head . . . fell on him. Can you hear me OK? Your signal isn't very—"

"Stratton?" Duvall's voice blasted over hers. "Who are you talking to?"

"Quiet!" I shouted. "I've got your shuttle on the radio. The pilot's injured, but the passenger, Saskia something or other, is OK. Saskia, can you hear me?"

"Yes. Barely."

"Same here," I said. "There's lots of static, and the wind's blowing. I'm getting about three-quarters of what you say, but if you talk slowly I think we can manage. The ship's listening in on my half of the conversation."

"Good. How long until you get here?"

"A day if I don't run into trouble. Maybe two. Can you hold out that long?"

"I've got half a year's supplies . . . all over the ship."

There came a long burst of static, then, ". . . Have to help the . . . making noise. Don't go away now."

"I won't," I said. Then, turning down the volume, I said, "Captain, she's evidently checking on the pilot. I'm getting her signal directly, but it's pretty weak; can you boost the gain on the comsats?"

"They operate at maximum all the time," Duvall said. "There's just too much atmosphere in the way at this angle to pick up a weak transmission.

We could put a satellite in polar orbit, but we'd only get a few minutes of contact every hour or two when it passed overhead."

The radar beeped at me and I swerved to miss a depression in the ice. "It's not worth it," I said. "I'll probably be in contact more than that."

"Right. We'll monitor your signal."

"Good, but don't talk unless you have to. I've got the volume up all the way."

"Understood."

I waited for Saskia to come back, during which time I wondered if there was any point to my continuing on. The shuttle's medical supplies were just as good as what I carried, and Saskia could care for the pilot as well as I could. She didn't need me there just to help wait for the new shuttle.

But I was already close to halfway there, and if something else went wrong she *might* need me. And I could wait for my replacement there as well as back at the station.

I examined the radio while I waited for her, looking for some way to tune in her signal better. The control panel had a button labeled NR, so I pushed that in the hope that it meant Noise Reduction. It must have, for a few minutes later I heard Saskia's voice saying, "Hello, are you still there?" It was still faint and shot through with static, but not as bad as before.

"Right here," I said.

"Good. How far away are you?"

"About six hundred kilometers. Half a day's drive, if nothing unexpected comes up."

I couldn't tell if I heard her sigh, or if it was just the wind. "Well, things haven't exactly worked out the way I thought they would so far, that's for sure."

"I know the feeling."

"Oh? Oh, you mean driving all this way. I'm sorry about that."

I laughed. "No apology necessary. That's not what I was talking about. This is the most exciting thing to happen to me since I got here; *that's* the problem."

"Is it so boring here then? I was afraid it might be."

"It's boring enough that I asked for an early replacement," I said.

"You what?" I thought I heard panic in her voice for the first time. "You can't do that . . . can you?"

"I can and I did. As soon as the *Nereid* gets another shuttle on line, I'm out of here."

She was silent, and I suddenly realized what was wrong. She didn't want to hear about people freaking out on the first day of her tour, especially after what she'd been through.

"Hey, look," I said, backpedaling as fast as I could, "not everybody reacts the way I did to the place. You'll probably be fine. I just discovered I'm not the solitude type after all. I made a mistake coming here, but that doesn't mean you did."

"Maybe not," she said. "I don't know. Hell." She didn't speak for almost a minute, and I was beginning to wonder if we'd lost contact when she suddenly asked, "Why *did* you come here?"

I looked out over the ice. Nothing but white flatness from horizon to horizon. "Escape," I said simply.

"From what?"

I had to think about that. Not about the question so much as whether or not I wanted to answer. I'd never really talked to anyone about it before, and I wasn't sure I wanted to now. So I just said, "A bad marriage."

"Really? You were married? Tell me about it."

"No."

"Come on, I'm curious. Not many people do that anymore. Besides, if you really did ask for an early replacement, the *Nereid's* counselor is going to rip you apart; you might as well polish your story."

I didn't much like her choice of words, nor was I crazy about trying to converse through all the static, but she evidently needed to talk, and I supposed she had a point. "All right," I said, "what do you want to know?"

"Tell me what it was like."

Hmm. How to describe marriage to someone who'd never been there? I thought about it a moment, then leaned back and said, "It was like bringing opposite poles of a magnet together. . . . "

I described how wonderful my first few years with Roxanne had been, how we'd done everything together, exploring first all that the Earth had to offer and then moving to the Moon when I'd gotten the job there. I tried to explain how complete we felt, how inseparable. Then I told her about finding Roxanne in bed with somebody else, and how I'd felt so betrayed that I didn't think I could ever look at her again, and how I'd left for Glacia so I would never have to. I finished up with, "—I thought I could forget her, take a tour with the World Restoration League and go back to Earth after a century or two and start over again, but it didn't work. I keep dreaming about her. The harder I try, the worse it gets."

Saskia had listened patiently to it all, but now she said, "So, what, you're going to run away from this, too?" Even with the lousy signal, I could hear the scorn in her voice.

"What else can I do?" I demanded. "Solitude didn't work. It's driving me crazy."

"Nothing's driving you crazy but your own guilt," she said. "You can't outrun that."

"What guilt? She's the one who cheated on me."

"So what? You still love her. It's obvious you do. But you ran out on her just the same."

"You're crazy. I don't love her. Not any more."

Saskia laughed. "You're a terrible liar."

That stung. "It makes no difference!" I shouted. "She doesn't love me, and even if she did she'd be over a hundred years old by the time I could get back to Earth."

"How do you know she doesn't love you? Did she tell you so? Or is it just because she slept with another man?"

"Isn't that enough?" I asked. I was coming up on a meter-high drift. The radar beeped at me, but I kept the crawler aimed straight ahead, imagining Hammond's body lying in front of me. The crawler slammed into it, bouncing high and spraying ice and snow in all directions.

Saskia said, "God, I didn't know men could be so dense. You were on the Moon! The most permissive society since the 1960s. And I don't suppose your wife had a job or anything. What did you expect her to do with her time?"

"You're saying she did it just because she was bored?"

"Bored and horny. I've lived on the Moon; the lifestyle gets to you. I don't know what your sex life was like, but it sounds like you were busy at work all the time, too tired to perform when you got home most nights, right? Who could blame her for a little recreation, especially when it was so easily available."

"I could," I said.

"Look, she was probably doing you a favor. She could have started demanding more from you at home, made you give her more attention when you were already tired. Your job would have suffered."

"Oh, so now she did it to save my job? I don't buy it. If she loved me, she wouldn't have—"

"Oh for Chrissake, Stratton, wake up. Look here, you still love her, don't you? Come on, admit it."

"All right!" I said. "Maybe I do. What of it?"

"This of it. You've been on this dirty snowball for six months without a woman. You've been bored out of your mind the whole damned time, but now there's me. You'll be here tomorrow, and I'll admit I'm already hot for a man's touch. You're going to turn me down?"

"Cut that out!"

"What for? I'm stuck here now, too. I signed the same damned contract you did, and I don't plan to waste what few opportunities I get for recreation."

The wind whistled past while I tried to think of a response.

She didn't give me a chance. "I'm young, Stratton. My breasts are round and firm and my nipples stick out when I'm cold, and there's nothing but ice all around me now. I've got warm, hungry lips. I've got legs that can wrap all the way around you. What do you say?"

My mind was numb, but it didn't matter. Hormones were in control of me now.

"Come on, Stratton, what do you say? It's been a long six months."

I had to swallow before I could speak. "I say you're right. Damn you for a psychologist, but I say yes. I hope you really want what you've talked yourself into."

"More than you could know," she answered, and I heard the triumph in her voice even through the wind.

There didn't seem to be a whole lot more to talk about. Saskia signed off, saying she needed time to prepare her boudoir, and I tried to concentrate on my driving. I called the *Nereid* a few times for navigational fixes, but I suddenly didn't feel too talkative with them, either. Maybe I was afraid Duvall would come on to me, too.

And maybe I was afraid I'd accept.

I felt more disoriented now than when I'd found Roxanne and Hammond in the sack together. A woman I'd never seen, never even talked to before, had just propositioned me, and I'd just taken her up on it. Why had she done that? Why had I?

This of it, she'd said, and then the come-on. She'd been trying to prove that Roxanne loved me. What a strange way to do it!

But she'd made her point. I did love Roxanne, I knew I did, yet I'd accepted a proposition from another woman. No matter that I'd never see Roxanne again; I'd proven with my own actions that she could have still loved me when she did the same thing on the Moon.

Then I'd been a fool to leave her. I'd been the worst kind of fool, a proud one, and I had let my pride send me off to a place from where I could never return. I had wanted her out of my life; well I'd done a good job, and in doing it I had done her a wrong much worse than the one she had done to me.

But it was already eighty years too late to change it.

So I did the only thing I could do under the circumstances: I drove northward toward the woman who waited for me now.

The compass buzzer pulled me out of a trance a few hours later. I shook my head and straightened out of the crawler, wondering why my head felt so fuzzy. It was still daylight.

Idiot. I'd driven far enough north, it would be daylight for another month at this lattitude. I looked at my watch and realized I'd been up for almost twenty-six hours. I had adjusted to Glacia's long days, but there's a limit. I called Saskia to tell her I was stopping for a nap, but she didn't answer my call. Either she'd turned the radio off, or the skip conditions had changed. I told *Nereid* what I was doing, then pulled back on the throttle and let the crawler shudder to a stop.

The wind seemed lighter here. Either that, or it just seemed that way without the constant rumble of the tracks on the ice. I unlatched my seatbelt, set my watch alarm for four hours, and lay back in my seat to wait for sleep to take me.

When I woke, I felt completely refreshed, better than I usually felt after a whole night. I wondered why, then realized I hadn't dreamed at all. Marvelling at the novelty of it, I fixed myself breakfast, then powered up the crawler again and drove away.

The mountains advanced steadily as I drove. I still couldn't raise Saskia, but the *Nereid* called with more course corrections and landmarks to look for, and they assured me that the shuttle was still radiating infrared, so nothing had happened to her lifesystem.

Under the *Nereid's* watchful eye I managed to keep out of the most rugged terrain, and soon I found myself between two canyon walls, climbing the gently-sloping glacier they said would take me all the way to the top. There were boulders in the ice bigger than the crawler, but the glacier was wide enough that I had plenty of room to steer around them.

I laughed at my earlier apprehension. I should have known the polar ice would wear a nice, wide gap through the mountains after all the millennia of glaciation. I *did* know that, but I was always making things seem worse than they really were. That's how I'd gotten to Glacia in the first place. If I'd thought things through before I'd acted, I wouldn't have come. I would never have left Roxanne, and I wouldn't be yearning for her now.

Enough of that. She was gone, and I'd best start getting used to the idea. I'd been stupid and I'd made a colossal mistake, but it was done and there was no way to undo it. The only thing I could do now was learn from it and try to do better in the future.

The future. There was something I hadn't thought about in a long time. I still had one, though, and it waited personified in a shuttle only a few hundred kilometers to the north. Except I was shipping out with the *Neried* as soon as they could come to get me.

Or was I? I suddenly realized that Saskia had just kicked the props out from under my reason for leaving. She had shown me why my dreams were haunting me so, and if my nap was any indication then I doubted if they would come back. Even if they did, a couple of sessions with a good analysis program would probably exorcise them again. I could stay on Glacia if I wanted to. I could finish what I'd started.

Right now that seemed like the most positive step I could take. Afterward I could work on rebuilding my life, but first I could honor my commitments.

The glacier grew steeper, and the radar started picking up fractures which I had to maneuver around, but even so the driving felt easier. I was carrying a lot less baggage now.

I started seeing more and more rocks in the ice, strung out in long parallel lines running up the canyon. Medial moraines, the seams where different ice flows came together somewhere up ahead. Each one meant a fork in the path, but the *Nereid's* map kept me on the right glacier, and after a while I could tell where to drive just by the different texture of the ice. The one I wanted was old, fed by the polar ice cap. Where the snow had weathered away I could see down into it for several meters.

I stopped the crawler at one point and got out for a closer look. The whole inside of the glacier glowed softly with the greenish light of ancient ice. There was hardly a bubble or an opaque spot as far as I could see. The rocky floor of the canyon was lost in the depths, hundreds of meters below, but it seemed to me as if the ice went on forever.

I raised up, and realized I could stand in the wind without holding onto anything. I had to be near the top. I had climbed up into air that was just starting its long descent.

The end came abruptly. I wound my way slowly up through a wide curve to the left, looking nervously at the radar for crevasses, when I glanced up and saw ahead of me a flat expanse of ice like the surface of a frozen ocean. A few promontories of rock stuck up between me and the ice cap; mountain peaks buried to their chins in the ice. I picked my way around the last of them and drove out onto the north polar plateau.

Saskia still didn't answer my radio call. No matter. I was only a few hours away now.

I could feel the anticipation rise in me as I drove. The emotions that I should have felt when I came to Glacia were taking hold of me now: a sense of adventure, and of wonder, of heading off into the unknown. Who was this Saskia, this woman who could make me see my own mind better than I could myself? She had made me see a lot of things, made me *feel* for the first time since I'd been here. She'd awakened something I'd thought had burned out when I left Roxanne.

I wondered why she had come to Glacia. She had never gotten around to telling me her story.

And suddenly I knew. It only made sense one way: Saskia was Roxanne. Of course! How could I have missed it? Garbled voice or no, I should have picked it up immediately. If she hadn't deliberately altered her speech patterns, I would have. But it was her, it had to be. She knew me better than anyone, maybe better than I knew myself. She knew I would eventually regret leaving her, but I'd let my arrogance and pride send me on a one-way trip. I could never go back to her—but she could come to me.

Oh yes, the more I thought about it, the more sense it made. She couldn't know for sure if I was ready to forgive her, so she had planned to spend six months just out of reach, wearing down my resistance until I begged her to take me back, but the crash and the realization that I was leaving Glacia had made her change her plans. When she'd realized that I couldn't identify her by voice, she'd decided to teach me my lesson the fast way.

She'd succeeded. I didn't care about What's-his-name anymore; she'd left him for me.

It was all I could do to keep the crawler down to sixty. I wanted to get there *now,* hold her in my arms again, smother her with kisses. But this would be a really stupid time to fall into a crevasse, now when all the wrongs in the Universe had suddenly been righted.

So I drove carefully, and a few hours after I emerged onto the ice cap, I saw a glint of silver on the horizon. It grew as I approached until it dwarfed the crawler: the shuttle resting at the end of a trench of plowed snow and ice. That was normal, though. The pilots usually skidded them in when they landed on ice, to avoid melting a puddle with the jets. I looked for other signs of a crash, but the stubby wings and tail fins were still intact. In fact, the shuttle hardly looked damaged at all. It was evidently made of tougher stuff than I'd thought.

I drove around it a couple of times before I pulled in beside the airlock, but there were no signs of life outside, and the cockpit was too high for me to see into. I didn't care; in a moment I would be face to face with Roxanne again.

The wind was hardly more than a breeze when I stepped out of the crawler. I crossed the few meters to the airlock, listening to the squeak of my boots in the fractured ice and snow. The shuttle had come to rest with the door about chest high. I raised my hand to open it, but it swung inward before I connected, and I stood there like a statue with my hand extended upward toward a complete stranger.

She was at least a foot too short, with dark hair and skin, brown eyes, and a thin, angular face.

"You're not Roxanne," I gasped when I got my breath back. She stared at me as if I'd spoken a foreign language, and if she replied then I don't remember it because I suddenly knew where Roxanne was. Horrified, I leaped into the airlock and pushed past the imposter into the shuttle.

"Roxanne?"

"Hey, what the hell are you doing?" she demanded, slamming the door behind me.

"Looking for my wife," I told her, but I stopped just inside the airlock's inner door. The shuttle was in just as good shape inside as out. No cargo broken loose, no smell of shorted electronics, no red lights glowing on the control panels. And no injured pilot. Just a row of empty passenger chairs behind the two control couches.

"What's going on here?" I demanded. "Where's Roxanne?"

"Roxanne's not here," she said, softly, as if talking to a wild animal. "I'm sorry if I led you to think she was. I didn't mean to do that."

I turned back around to look at her. "Well what the hell did you mean to do, then?"

"Force you to confront your guilty conscience," she answered. "Make you realize where your dreams were coming from."

I looked back into the shuttle, all its equipment apparently in perfect working order. "You're the ship's counselor, aren't you?" I asked.

"That's right. And the shuttle pilot. We tend to double up our skills when we can."

"This whole thing was a setup," I said. "Applied psychology, frontier style."

"That's right."

I sat down heavily in one of the passenger chairs. "Then Roxanne isn't on the starship either, is she?"

She shook her head. "No, she's not. Why did you think she would be?"

I struggled to find the words to explain it to her. "She *has* to be. That's the only way it can work."

She came up beside me and rested a hand on my shoulder. "It's going to have to work without her, because she's not here."

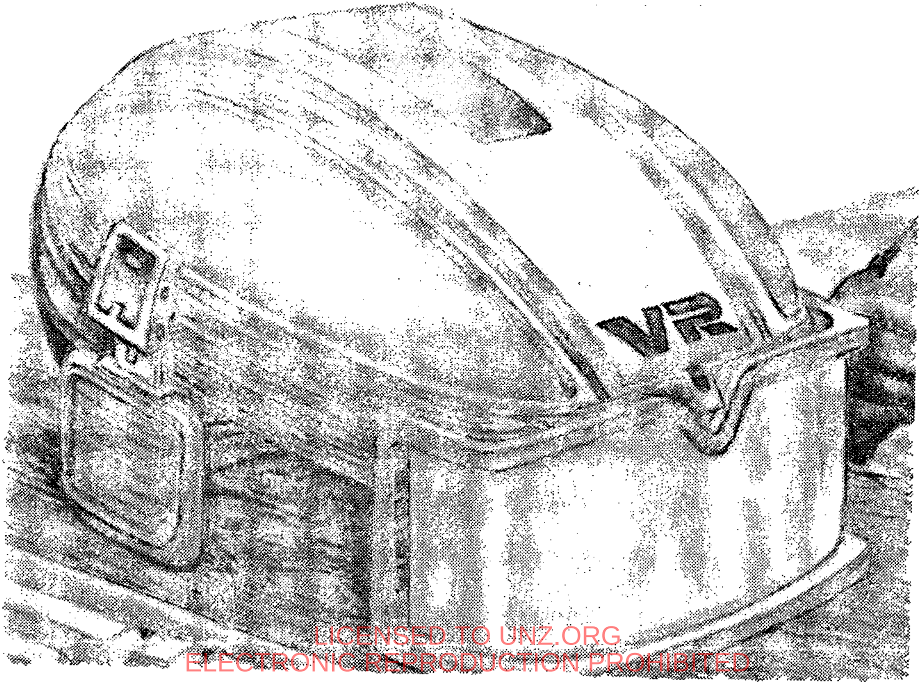
I looked away from her, out through the windshield at the brilliant white ice. "She will be," I said. "If not on this ship, then the next one, or the one after that." She would come for me. I knew she would. She had to. She still loved me, and I still loved her. It might take her a while to realize that, but I would be here, waiting for her, no matter how long it took. ■

Doug Larsen

A PORTRAIT OF MY GRANDFATHER

When you dream of falling, do you die if you hit the ground?

Illustration by Dell Harris



DENIAL

My earliest memory of Grampa was when I was about three years old. We were playing ball in his back yard with my older cousin Randy. Randy was five, and was pitching to me. I could hardly lift the bat, so Grampa was crouched down behind me, helping me hold it. Normally I didn't like playing sports with Randy because he could do everything better than me. But I felt fine that time, because Grampa was there.

Randy threw the ball and I didn't swing, which made him mad. "You're supposed to hit the ball, Greg," he yelled at me.

Since I was with Grampa, I felt safe in taunting him. "No," I said.

"All right, I'm telling," Randy announced, and stormed into the house.

I got a little worried when he slammed the door behind him, but then I looked back at Grampa. He smiled his slow, gentle, crinkle-eyed smile. "Now, see what you've done?" he said jokingly. "You've gotten us both in trouble."

I smiled, and snuggled back in his arms. I wasn't afraid with Grampa around.

I have a lot more memories of Grampa. And they all came flooding back to me one day when I was in eighth grade.

It was shaping up to be a pretty good day. I was sitting comfortably in Computer class. It was the only class I kind of liked, and the to-die-for Tiffany Montgomery, sitting across the aisle from me, had just crossed her legs in my direction. Not that she even knew I existed, much less which direction I was, but it was still nice to sit there, pretending to concentrate on the computer screen, but actually looking her over out of the corner of my eye.

She was wearing one of those short-short-short black leather skirts that all the popular girls wore, and was casually twirling a lock of her long, teased hair in her right hand. I didn't care much for her choice in hairstyles, but I had to admit she added up to a phenomenal package.

There was a lull in the class as the teacher got busy at her projected computer screen. Tiffany looked around at Brad Andrews, sitting in front of me. Brad was a casual friend of mine, but at the moment, I hated him because Tiffany was looking at him.

"Hey, Andrews!" she whispered.

Brad looked at her, surprised.

She smiled sweetly. *"Faggot!"* she hissed.

Brad visibly recoiled in shock and surprise. He furrowed his brow, and then turned back to his computer without saying anything. I snickered uncomfortably along with everyone else within hearing range, and tried to slide inconspicuously lower in my chair. *Don't look my way,* I pleaded silently. *Just leave me alone!*

Tiffany seemed done. She smiled with satisfaction, and went back to ignoring everyone.

The door opened, and the assistant principal came into the room.

Everyone in class looked up with interest. The assistant principal was the enforcer in the school, and if he was here, somebody was in for it.

He went up to our teacher, and they whispered for a minute. Then the teacher looked up over the class—and pointed straight to me!

Everyone turned to see who she was pointing at, and I turned beet red. *Who? Me? I didn't do anything! Don't look at me—look anywhere else!*

The assistant principal motioned me to the front of the room. "Bring your things," he instructed. I obeyed, feeling more and more dread.

I walked out of the room with him. "I—I didn't do anything," I croaked.

"I know you didn't," the assistant principal said. "Come on into my office for a minute."

I followed him blindly. He led me into his office and had me sit down.

"Greg," he said gently, and suddenly I felt even worse. "I'm afraid I have some bad news for you."

I stared at him helplessly. If he thought it was bad news, then it was really, really bad news. Like, adult-bad news.

"I'm sorry to have to tell you this," he continued, "but I'm afraid your Grandfather Al Melfred, has died."

Grampa? Dead? I stared at him numbly, paralyzed by shock. *Grampa? Why, I saw him just two days ago! He looked great! I know he had a weak heart, but still....*

"Your dad is coming to pick you up," he went on. "He wants you to be with your mom and grandmother, and help him give them some support."

Grampa was dead. He couldn't be. I followed the assistant principal numbly as he led me down the hall and sat with me on a bench by the main door until my dad pulled up. Numbly, I walked over and got into the car.

"Hi." I said tonelessly.

"How are you holding up?" Dad asked.

"OK."

We rode in silence for awhile.

"Grampa died of a heart attack," Dad said quietly. "He was doing his virtual reality medication, and his heart just seized up on him."

Virtual reality medication. I remembered when Grampa saw me playing my first virtual game. I was so excited, because it was so much better than the video games I was used to, and I wanted Grampa to play it with me. But he just smiled gently and shook his head.

"It sounds great," he told me, "but I'm a little too old to be doing adventure games. You do those programs, and I'll do the relaxing ones."

One of the neat things about Grampa was that he made virtual reality programs. He was a big-shot project manager and chief programmer until he retired, and had produced many of the hottest virtual reality programs on the market. He's the one that really got me into programming, and we'd sit for hours, side by side, hacking around. I loved it, and Grampa was a good teacher. By the time I started serious computer classes in school, I was light-years ahead of everyone else.

One of the first real applications of virtual reality was when an architectural firm designed a building on its computer, and then hooked up a treadmill and a pair of goggles to the computer. The client was able to walk on the treadmill, look through the goggles, and see the building, as if it had really been built. But things had improved a lot since then. Through a connection between the goggles and your brain, the computer programs in virtual reality now felt really real.

I'd heard about some of them: virtual porn disks that I was pretty sure I disapproved of, but was really curious about anyway. If they felt anywhere near as real as my space battle programs, then *yowzah!*

But anyway, Grampa's virtual medication was a program called Virtual Meadow. In Virtual Meadow, you stood on your treadmill with your goggles on, and you felt for all the world like you were in this meadow, without another person around for miles. It didn't matter where you really were—in a virtual booth in a mall, or renting a room in one of the new virtual motels—it felt like you were in the meadow. Grampa let me try it once. He said it was the most relaxing thing he'd ever experienced, and I agreed, although it was also kinda boring. But he didn't think so. And his doctor said that if he were to spend an hour a day in Virtual Meadow, it could really help his heart and reduce the drugs he had to take.

I looked at my dad. "So the Virtual Meadow stuff didn't help Grampa, huh?"

"I guess not. He had the heart attack while he was using his Virtual Meadow medication. I guess when your heart decides to seize up, it's going to do it."

I sat there in numb misery. It wasn't possible that Grampa was dead. It just wasn't. Pretty soon, I was sure, I'd wake up and have to shake off this terrible dream.

But I didn't.

Mom was still completely crushed two days later, at the funeral. I stood in back of the church and looked at the sea of heads. There must have been a thousand people there. Behind me, Mom and Gramma and Aunt Wendy were hugging and crying again. The organ, which had been playing something soft and low, changed hymns. Uncle Kevin took Aunt Wendy's arm, and my dad sidled up to me.

"Take your Grandmother's arm," he whispered to me. "Escort her down the aisle."

I walked over to Gramma uncertainly. "Wanna go with me, Gramma?" I whispered.

"Thank you, dear," she said. She wiped her eyes and took my elbow. "Your Grandfather loved you very much," she whispered.

"I know," I choked. "Me too. Him, I mean."

She patted my arm and took a deep breath. "Let's go."

She stood very straight, and looked strong and forlorn as we walked forward to say goodbye to Grampa.

I was allowed one day off of school after the funeral, and then had to go back. I hated it. I sat through my computer class, not even bothering to listen, not even bothering to look at Tiffany Montgomery. She had some real tight pants on, and they hid her legs. I made a mental note to be sure to catch a look at her from behind as she was walking, though.

The teacher briefly mentioned virtual reality, and I thought about what Grampa had told me about virtual reality programming. We'd been sitting on his front porch one summer evening, enjoying ice cream cones, and the subject turned to software. "The programming is really complex, Gregman," he said. "Since it's controlled by the user, it's never the same program twice."

"How's it work, then?" I asked. I remember the flavor of my ice cream: peppermint candy.

He took a healthy lick of his. Maple nut. "Well, say you're using Virtual Meadow, for instance. The program has a big section devoted to a 3-D view of the meadow. But all of the other stuff is in individual packets, placed at random in the program, waiting to be accessed by the user."

"So, like, if I never look at the forest, the packets with the deer in the forest won't be used?"

"Exactly." He seemed proud of me, even though that was basic stuff. "You control the program to a much larger extent than any previous programs. And the Virtual Meadow experience is never the same twice."

"What if you went in and did the exact same thing as last time?"

Grampa shook his head and smiled. "It's impossible. You'd never be able to exactly duplicate the steps you took, how quickly you moved, where you looked, and when, and so on."

I digested that and bit into my cone. "Cool."

"Yeah," Grampa agreed, putting his feet up on the porch railing. "From a programmer's point of view, it's fascinating. You're using the same software package, but the linear history of how each packet is accessed will be different every time."

"What if you use it one day, and really like what you did? Is it gone forever?"

"Pretty much," Grampa conceded.

"Too bad you can't look back at it and see why you liked it so much," I commented. The cone was getting mushy, and I bit off the soggy part.

Grampa turned slowly and looked at me with great respect. "That's an excellent idea! If you analyzed the ones you liked the best, you might find out some sort of pattern or color or series of packets that really strikes a chord with your brain. You could discover something new about how we react to that kind of stuff!"

I was glad I'd impressed him, but didn't know where to go with it. "How do you do that?" I asked.

"Well," he thought out loud, "I suppose you could take some digital tape and record each experience you have. Then you could look at it afterwards, and it would all be there in linear form." He nodded slowly to himself. "Yeah. I think I'll do that."

That had been over a year ago. He had told me later that he was doing it, and was enjoying looking through the linear progressions and seeing the differences between them. It would actually be pretty cool, going through his last Virtual Meadow experience, because it was uniquely his. I missed him so much, that even something like that would feel like it was part of him.

I still couldn't believe he was dead.

After class I wandered down the hall behind Tiffany Montgomery. Those tight jeans really showed off her hips and behind. I was so absorbed by her beguiling hip motion that I didn't know that someone was watching until a thick wad of paper whacked me on the side of the head. I shook my head in surprise, and a chorus of jeering laughter pelted me.

"Hey, Walters!" a nasty voice cut through the noise. "Wake up, stupid!"

I turned to see Bruce Heber and some of his friends laughing at me. They were cool guys, or jocks, or both, and they never paid any attention to me unless they wanted to pick on me. I was an ideal target: fairly tall, so I made an impressive target, but very shy and uncertain, so I was an easy target. I couldn't think of anything clever I could say, and wouldn't have dared to say it if I had thought of something. I turned to walk away, and Heber shot forward and knocked my books out of my hands. My looseleaf notebook hit the floor and burst open, showering papers everywhere. Without a word, I knelt down to pick up the mess. Laughing, Heber and his friends walked away, making sure they stepped on my stuff.

I wished I had a gun. I wished I was a trained fighter. But I wasn't. I was a nerd, and I was used to this kind of humiliation. I pretended I didn't see all of the people looking at me, and finished picking up my stuff. I saw Mary Adams and some of her friends—fairly nice girls, not in the cool, cruel crowd—looking on with some sympathy. I didn't want sympathy, I wanted admiration, and they just made me feel like more of a loser.

I walked away as slowly as I could.

That Saturday, we went to visit Gramma to see how she was doing. I slipped away and went into Grampa's office. He was always real organized, so I found the tapes without any problem. I chose his latest cassette, and picked up the Virtual Meadow disk, too.

I didn't mention it to anyone—I just put the tapes in my pocket, and felt better knowing I had a little bit of Grampa's personality with me. I figured I would go and play it sometime after school.

The mall downtown has some virtual booths, and I headed there before dinner a couple of days later. I was lucky that one was open, so I went in and slipped in Grampa's cassette recording of his last Virtual Meadow experience. I know he really enjoyed them. I thought of that smile of his, and I smiled too, but I was sad. I was going to do what Grampa had done, but now I had to do it without him.

The meadow was really wonderful. Since I was experiencing Grampa's sensations, I just stood still and let him take me wherever he wanted. Looking at it through Grampa's eyes for the first time, I noticed it was quiet and soothing and peaceful. I strolled along, feeling the tall grass brush my legs. There was a grove of trees up ahead, and I could hear birds singing. A soft breeze blew against my face. Meadow flowers were blooming everywhere, and butterflies flitted around. I stood on top of a slight hill, and gazed at the scenery unfolding before me. Way in the distance, a river flowed, and I could see an eagle soaring above it. I strolled along farther, and saw a deer and her fawn standing just outside the grove of trees. They looked at me, and then turned and disappeared into the trees.

Some nice flowers were bunched together just to my left, and I headed over to smell them. Just beyond them, some shrubs were clustered together, and they had lilacs all over them. The scent wafted toward me, and I moved to admire them. I got close to them, and there was a movement in the shrubs, and *oh my God there's a man with a ski mask jumping out of the shrubs and he's got a gun and no don't shoot and the sound of the gunshot ruptured my eardrums and the blast caught me in the chest and I was on the ground and everything went dark!*

It was a minute before I discovered that I was on the rough carpet of the mall's virtual reality booth. The fall had jarred the helmet from my head, breaking the connection, and I clutched at the carpet, drenched in sweat. Oh, my God, what was that, anyway?! It scared me to death! I was covered in sweat, my heart was pounding, and my chest still hurt from where the bullet hit! It just about gave me a heart—a heart . . .

. . . A heart attack.

Home was two miles away, but I didn't stop running until I was inside. With my last gasp of breath I slammed the door, shot the deadbolt home, and collapsed against it, gasping for breath. I sagged to the floor, trembling and crying. I stayed there for a long time, with all kinds of thoughts flooding through me. Grampa didn't die of natural causes, like the doctor said. It wasn't his time, like Dad said. God hadn't called him home, like Gramma said.

He was murdered. Somebody took Grampa away from me before he was supposed to go.

And somebody was gonna be sorry.

ANGER

I spent a lot of time alone. I spent a lot of time going through the stuff I had done with Grampa, and a lot of time at the virtual arcade. Everyone thought I was playing my space games, but they were wrong.

Once I overheard Mom and Dad talking about sending me to a shrink to help me deal with the death of Grampa. I didn't care. They didn't know what I knew, and they weren't going to find out. Nobody was gonna know. But somebody was gonna be sorry.

It didn't take long to figure out how the killers rigged the virtual gunman. It was just a five-second sight-sound-feel packet that had been laid in over the regular Virtual Meadow program. It had a timing device, like a software bomb, that activated the packet after the twenty-third time it was used.

And then, after it ran once, it must have erased itself. The program disk didn't have any gunman in the lilacs.

It was only on Grampa's recording of that one time.

Grampa had been using the Virtual Meadow disk every day, for over a year. But if the gunman was programmed to activate after twenty-three uses, that meant that somebody had put it into his disk just before he retired from his job. Or, more likely, had laid the killer packet into an identical disk, and switched them when Grampa wasn't looking.

But knowing how it was done didn't help me much. I needed to know why.

And who.

I figured it had to be somebody who was a professional, which meant, somebody where Grampa used to work. Researching his company didn't tell me much. Advanced Game Tek was a large corporation that was making a lot of money. Big deal. They held 60 percent of the world's market share in virtual games, and 90 percent of the market share in kid's games. They were a wholly-owned subsidiary of SKS Holdings, which was a big holding company that included a major food manufacturer and SKS Products, which made cigarettes.

Big deal. This didn't help at all.

I was screwed.

There's this big old oak tree in our back yard that I used to play in a lot when I was little. I still go and hang out around it, because there's lots of bushes nearby, and you can sit in the lower branches, or on the ground around it, and nobody would see you. It's a nice place to sit and think.

Well, I was hacking around one day, not sure what to do about finding out more about Grampa's killer, and I decided to climb the old oak tree. It's comforting, somehow.

I sat in the lower branches for awhile, but got restless. Up in the tree, in one of the first big crotches of the tree, there's a hole. You wouldn't even know it unless you were right on top of it. I'd used it as a hiding place for valuable stuff when I was a kid. The only other person I'd ever shown it to was Grampa. So I checked it for the first time in ages, just to see what junk I'd left in there.

It wasn't interesting: an old pocketknife, some moldy candy, a stiff packet of gum, and a couple of comic books. Boring junk, but I flipped through the comics for a minute, since I didn't have anything else to do.

I didn't even notice when something slipped out of one of the comics, except it went smack when it hit the dirt below the tree.

I climbed down to look at it. There were a bunch of white, printed pages with handwritten notes on them, folded over and sealed in a plastic bag. I got quite a shock when I realized that it was Grampa's handwriting in the margins!

I ripped open the bag and pulled out the papers. Written on the top of the first one was a note to me.

Greg-man, if you find this stuff, let's keep it our secret, OK? Keep it hidden, and tell me about it in private.

Love, Grampa.

Well, for crying out loud! I never

knew that grampas had secrets, too. I couldn't tell Grampa that I'd found it, of course, but maybe I should tell Gramma. But Grampa wanted this to be our secret, so I couldn't. I couldn't even tell Mom and Dad.

I went up to my room and looked the stuff over. It was software stuff, no question about that. Grampa must have gotten them from work. The code stuff was over my head, but Grampa had written notes to himself in the margins, and with his help I thought that maybe I could figure it out.

The notes called for a virtual adventure game that I happened to have, so I popped it into my computer. I was glad that the notes called for that one, because it was one of my favorites, and I had sure missed it when Grampa had borrowed it for a couple weeks, about a month ago.

Basically, Grampa's notes gave me a kind of mechanical-password way to get into the code of the game, wading through the different events that made the thing click, until I got to the end of his list. I stared at it. This was a disappointment—just a software packet, like thousands I'd waded through. Except smaller, maybe. And kind of hidden somehow. I didn't think I would have run across it unless I'd had Grampa's instructions.

I shrugged and opened it up. I should have known better than to think that adults had interesting stuff going on.

Strange thing about that packet—it wasn't a sight-sound-feel. It was straight feel, with a sight intensifier tacked on, and it was coordinated to kick in at three different places in the game. Each time, it lasted for only three seconds.

It took some time, but I finally figured out how to find the three different spots that activated Grampa's strange little packet. The problem was, the codes were so complex that I couldn't figure out what they represented. I flagged the packet, and the three places it was supposed to kick in, and went to the mall.

I reviewed the rules of the game. It was kind of a takeoff of the old Indiana Jones adventures, where I was a daring adventurer, armed with a six-shooter, a whip and a sword. I had to run a gauntlet of obstacles to achieve my ultimate goal of finding a priceless gem. I loved this game, because it was so different from real life. In this game, I knew the rules, I was equipped to handle anything that came at me, and I knew that if I just practiced enough, I'd win.

I popped in the smart card with the program, and told the server to just show me the parts I'd identified. Then I put on my goggles and

I was in a cavern, facing the smooth, suave Nazi who was my main enemy. Securely protected by a bullet-proof window, he nonchalantly lit a cigarette (oh, wow, cool!) and activated the wall of spears! I knew how to handle this, and leapt aside into a tunnel....

The giant spiders swarmed around me, climbing the rock walls to drop on me. I swept out my sword and laid waste right and left. I expertly flicked the last one off the ceiling with my whip, and impaled it on *my sword as it fell. Since I disposed of them within the time limits, a beautiful woman appeared in a small window in the cavern. She smiled admiringly at me, lit a cigarette (oh, wow, cool!), and suddenly....*

I laid my hands on the gem with a rush of pride. It had a wonderful heft to it, and I savored it while I covered the Nazi with my pistol. He watched helplessly, casting about for a way to escape, but I had covered every possibility. I set the gem down, and deftly lit a cigarette with one hand (oh, wow, cool!) as I gazed cooly at my enemy. He made a desperate leap at me, and I nailed him with my last bullet as he—

The program shut off, and I peeled off the goggles. What was the big deal? Those were just snippets of the same old game I'd played thousands of times. Why would Grampa be so interested in that?

I scratched my head in puzzlement. I couldn't figure it out. I pulled on the goggles again, stared at the dull gray of the No Program screen, and triggered the packet to play by itself.

(Oh, wow, cool!)

I stared at the gray screen. It was the neatest shade of gray I'd ever seen. I stared at it in admiration for a minute. Maybe I could paint my bedroom walls that color. If I had a shirt that color, all my problems would be over.

The whole thing didn't sink in until I took off my goggles again and I realized what had just happened. The packet was a mood and emotion packet! I'd heard of them before—the horror games used a lot of them. But the way they were used in this game didn't make any sense. It didn't help the story at all, and it didn't make anything more exciting.

It just made you think smoking was cool.

I hustled home and pulled out every virtual reality game I had. Following Grampa's instructions, I went through them on my computer. Half of them had the packet Grampa had flagged. By analyzing the binary fragments, I could tell they all used the same packet.

Now, why would they do that?

I quizzed my parents at dinner that night.

"Dad?" I asked, breaking a long silence. He and my mom looked at me in surprise. How long had it been since I'd said anything at the dinner table?

"Yes, Greg," my dad said, looking very pleased.

"Is it illegal to advertise cigarettes?"

I could tell that he was trying to shift gears into this unexpected subject. "Well—kind of. Cigarette ads were taken off TV years ago. And radio, I suppose."

"What about other places?"

"Well—they can still advertise in newspapers and magazines. But more and more magazines are refusing to accept them. And there are moves in Congress to limit them more."

"Why?"

My mom broke in. "Because their ads are aimed at kids."

"Now, you don't know that," my dad demurred.

"I do too," Mom said. "It's been proven over and over again. But the tobacco lobby has so much clout, and owns so many senators, that it just about takes an Act of God to get anything done about it." My mom is a real firebrand on this stuff.

My dad apparently decided that the important thing was to keep me talking, not to argue with Mom, so he turned to me. "Years ago, there was an ad campaign featuring a character called Joe Camel," he told me. "He was on the billboards for Camel cigarettes. Public opinion polls surveyed kids in elementary school and junior high, and determined that Joe Camel was the second most recognized cartoon character in the country, after Mickey Mouse. Eventually, he was banned and more restrictions were placed on that kind of ad."

"And that took years," Mom put in. "Even after it was proven that most smokers started smoking when they were fourteen."

"Why do you ask, Greg?" Dad inquired hopefully.

"I was just kinda wondering," I said. "Seems like there's still a lot of it around."

"Yeah, they do things like sponsor car races and things," my mom said. "They make sure their logos are prominently displayed at those events."

"But they're having trouble finding new ways to do it," my dad said. "The restrictions are getting tighter and tighter."

I'd found out what I needed. Now it made a lot of sense. And if they denied targeting kids, it made sense that they would try to hide these virtual ads. But to kill someone for it?

"What would happen if they were caught violating the advertising laws?" I asked as innocently as I could.

"They'd probably be fined," my dad said. "Not that that would make much difference to them, because they've got so much money."

"The main thing it would do, though," my mom put in, "is it would give the anti-tobacco lobby a big P.R. boost, maybe spur some major legislation that could really hurt them."

"What could hurt them?"

"Well," Dad said, "thousands of people die every day from tobacco-caused diseases. They have to replace them with new smokers just to keep their market share steady. Anything that impedes their ability to do so will have a major effect on profits. You could be talking millions of dollars."

Yeah, OK, I had everything. People would kill for millions. The newspapers were full of people who killed for a lot less, every day.

Mom looked sad as she poured another cup of coffee. "Your Grampa never much liked the fact that his company was owned by a tobacco company," she said innocently.

"Oh, really?" I kept my voice as neutral as possible.

"Yeah, he was pretty unhappy when they bought out Advanced GameTek," Dad said. "He had some major disagreements with the new management."

Mom set the coffee pot down with a bang. "He was even taken off a high-prestige project because of it," she said disgustedly. "They assigned the virtual reality teleconferencing project to someone who wasn't as good, but who didn't make waves."

My interest was fully aroused again. "Virtual reality teleconferencing? What's that?"

Mom thought. "Well, you know about the standard teleconferencing, where people in different cities can have a meeting together if they each have a video camera, a monitor and rent some satellite time? If you have it in virtual reality, then it feels like a real meeting. Your slides and graphics are snappy, the audio and visual aspects are realistic, and in general, it makes teleconferencing as good as actually being there. It's something SKS Holdings ordered after they took over. Your Grampa, being the best programmer with the best team, was assigned to the project—until he made a few choice comments about his new parent company."

Dad grinned. "Something along the lines of 'the morals of an alley cat in heat,' I think. It didn't go over real well."

Mom smiled in spite of herself. "Right after he said that, he was taken off the project. He was encouraged to take early retirement soon after that." She sighed deeply. "I wonder if that's what did it. I've heard about people who die shortly after they retire."

I stuffed half a pork chop into my mouth so that I wouldn't say anything.

The days of the hacker who could waltz into any file and look around are long gone. Even the most unsophisticated company has security protection that would defeat outsiders. I would have been stymied, if it weren't for Grampa helping me again.

There was a bunch of his handwriting on the backs of the pages I'd been using to crack the software codes of the Virtual games. I hadn't been able to figure it out, and after awhile I ignored it. But after the conversation with my parents, I pulled out the pages from under my mattress (hidden next to a copy of a lingerie catalog's "Sizzling Sale on Hot New Swimwear!" issue) and looked them over again. They seemed like tips on how to hack into a sophisticated system, and maybe the system was the teleconferencing setup.

I went over it for an hour before I figured everything out. Some of the notes made no sense at all, until I realized that I needed to hook up a virtual reality helmet to my computer. Since they only cost about twelve billion dollars, I was completely screwed. There was no way I could afford one of those, and I couldn't very well lug my computer down to the mall every time I wanted to use one. Just playing my adventure games was pretty much breaking my budget.

I was stopped for three days. I did nothing but think about it, day after day, hour after hour.

I was walking through school one day, brooding about Grampa. I stopped at my locker out of habit, and got the books I'd need for my next class. I couldn't have cared less about the whole thing.

"Hi, Greg," a female voice said. It just about scared me to death. I'd been oblivious to everyone and everything in school, so it was a surprise to find out that someone had noticed me.

I looked around, and saw Mary Adams smiling at me. Mary was in a couple of my classes. She wasn't one of the most popular girls, although she had several friends, which was more than I could say. She was kind of nice looking, but her hairstyle and refusal to wear short leather skirts had pretty much kept her out of my fantasies.

"Hi," I grunted. I wasn't used to talking much in school, especially to girls.

"How are you?" she asked.

"Fine," I grunted again. I felt my ears turning bright red.

"Listen," she said, "I was real sorry to hear about your Grampa."

Boy, was I impressed. Nobody in the whole school had said anything to me about Grampa. And I didn't know what to say back to her, so I just nodded curtly. "Thanks," I said shortly. Then I grabbed my books and hurried away.

I thought about the encounter all the way home. I wish I'd said something nicer to her, told her that I appreciated her taking the effort. She'd obviously reached out to me, and I should have asked her out on a date, or at least talked to her. But not me. I couldn't do those things.

When I got home, I saw Gramma's car parked outside. Since she only lived two blocks away, I wondered why she'd driven.

I soon found out. She had a big box of stuff on the kitchen table, where she and my mom were drinking tea.

"Hi, Greg, how was school today?" my mom asked.

"Fine," I muttered. "Hi, Gramma."

"Hi, Greg. I've got something for you," she answered.

"What is it?"

"It's a box full of stuff. I honestly don't know what most of it is, but it was all your grandfather's computer stuff." She sniffed, just once, but her eyes were moist. "He loved working on computers with you, Greg. It was one of his favorite things. I know he'd want you to have all of these gadgets."

I stood there, rooted to the floor. I wanted to say that it had been one of my favorite things too, that Grampa was the finest man I'd ever known. I wanted to say that this meant more to me than anything I could imagine. But I was just an eighth-grade nerd, and I couldn't say what I felt—I didn't know how. So I just stood there, looking at the box of gadgets, and then at my Gramma, and tears trickled down both of my cheeks and that was humiliating, but I was glad they were there, because I sure didn't want Gramma to think I didn't care about Grampa.

I walked up to the box and picked it up. "Thanks," I managed to choke out. Then I turned and ran upstairs with it.

It wasn't until a half hour later, after I wiped my eyes and blew my nose, that I looked inside and found the virtual reality helmet.

Another thing I remember about Grampa is fishing. I hate fishing. It's too hot, it's boring, and I hate the taste of fish. But I went fishing a lot.

See, Grampa loved to take me fishing. And because Grampa liked it, it was good enough for me. I even went so far as to eat the stuff.

I remember once when I was five, he took me fishing at a little stream. He must have been trout fishing, but at the time all I knew was that it was too hot and too bright. Well, Grampa saw me squinting a lot, so he gave me his baseball cap. It was way too big for me, and he adjusted it until it fit my little head. It felt like the brim stuck out a foot or more, but it did cut down on the glare.

Since I was bored when fishing, I liked to wade in the stream. No doubt, this had a negative effect on Grampa's fishing, but he never seemed to mind. Whenever I looked over at him, he was watching me, smiling that warm smile of his. I'd smile back, and keep on wading.

The first time I went wading, my mom had words with both Grampa and me, because I had used my shoes. After that, Grampa gave me his galoshes. They were huge things; came up about to my waist, but I figured out how to keep them on when I waded, and had a great time.

Since Grampa loved to fish, I pretended to fish every once in awhile. I stood there with my little fishing rod that he'd bought at the hardware store for me. One day he stood behind me and called my name. I turned my head to look at him questioningly, and he snapped a picture. Then he gave me that big smile, and I smiled back, and went back to "fishing."

A week or so later, he had the photo developed, and even I could tell that it turned out well. The adults all made a big fuss over it because I looked so cute, with my huge baseball cap, the enormous galoshes, and the fishing line going clear over the stream and disappearing in the bushes on the other side. And my expression was a really cute one too, so the photo was a big hit. Grampa showed it to us all, and then he put it in his wallet. He said it was his favorite picture. I knew it would be.

The next day at school, I was deep in thought about the teleconferencing monitoring. Would I be able to tell who killed Grampa? What kind of proof would I need before I killed someone? That would teach the bastard to choose someone at random and attack him.

I got my lunch and sat down at a table that was used by most of the guys in my class. A guy I knew was sitting across from me.

"Hi, Johnson," I grunted.

"Hi, Walters," he answered.

"How's the chess club going?" I asked, just to be polite while I opened my carton of milk.

Heber's voice broke in scornfully, "Walters, you faggot." Everyone else snickered uncomfortably.

I looked to my left. Heber was sitting a couple of guys away from me, and he had overheard my inane remark. Everyone else was studiously looking at neither one of us, and Heber was looking away in disgust and superiority.

I didn't answer. I opened the other end of the top of my milk carton, reached over in front of the guy between us, and dumped my milk against Heber's lap and chest.

Heber lurched to his feet in surprise and rage, but I was expecting it, and was already on my feet. He turned his face to look at me, and I caught him right in the mouth with my left fist.

It hurt. It hurt a lot. Heber's head snapped back with the impact, blood erupting from his mouth. I scrabbled out of my chair and swung my right fist at his head with all my might. I closed my eyes at the very end, but felt a bone-jarring impact with his face. When I opened my eyes, he was falling face forward toward the table. He grabbed the table to break his fall, and tried to push off from it when I jumped on him from behind, driving him down onto the tabletop.

I held him down, and only then did I realize what I had done. I never would have dreamed of having the nerve to do something like this. But I was still so filled with rage that I couldn't stop. I grabbed him by the hair, and began pounding his face into the table. "Aren't you glad you bothered me, Heber?" I shouted at him. "Don't you wish you'd left me alone?! Aren't you glad, Heber? Aren't you glad?"

I must have pounded his face into the table eight or nine times before a teacher pulled me off.

I spent the next day at home, filling the first of a mandatory three-day suspension. My hand wasn't broken, and I didn't get in much trouble from my parents or the assistant principal. Heber had quite a reputation, and my squeaky clean record, along with my obvious mourning of my Grampa's death, got me a light sentence.

I felt darned good about what I'd done to Heber. As a matter of fact, it felt great. But it didn't do anything about Grampa, so I decided to spend the time constructively.

I worked my way through the virtual reality teleconferencing security maze with shaking fingers. Grampa's notes guided me every step of the way, but I was tense and edgy, especially when I figured out that Grampa had guided me into the message center with the highest level of security possible. It wasn't just that nobody was allowed to read it—hardly anybody was even allowed to use it.

I figured out that sometimes the communications were teleconferences, but more often they were basically glorified e-mail messages with two-way message capabilities, sophisticated graphics, and the latest in high-level security measures. I was happy to discover that, because those were much easier to monitor. I could rig my computer to record the e-mails when I was at school.

I snooped around in the file, and found some messages that had been sent that day. Already I could see that I had struck oil:

TO: HAWKEY, ADVANCED GAMETEK

FROM: VAN IVES, SKS PRODUCTS

SUBJECT: ADVERTISING STATUS

PLEASE UPDATE ME ON THE STATUS OF THE ADVERTISING MESSAGES PLANNED TO BE PLACED IN NEXT YEAR'S VIDEO GAME RELEASES. I HAVE SOME BRAND NAMES I'D LIKE TO HAVE INCLUDED IF IT'S NOT TOO LATE TO

PUT THEM IN.
REGARDS, VAN IVES.

TO: VAN IVES, SKS PRODUCTS
FROM: HAWKEY, ADVANCED GAMETEK
SUBJECT: STATUS
PLANS FOR THE AD MESSAGES ARE ALMOST FINALIZED. WE CAN INCORPORATE YOUR CHANGE REQUESTS IF THEY ARE MINOR AND DELIVERED QUICKLY.
REGARDS, HAWKEY.

I monitored the secret message channel for a week, and started fitting some pieces of the puzzle together. I finally figured out that there were four conspirators involved in the advertising campaign, but I wasn't sure how many were involved in the plot to kill Grampa. But they were all real highly placed: Dirk Klemhauser, the president of the whole SKS Products consortium; Dave Hawkey, the president of Advanced GameTek; Luke Van Ives, the president of the SKS Products tobacco company; and Manny Gunderson, who was only identified as Klemhauser's special assistant. They all did a lot of talking through the virtual reality teleconferencing because the four were placed in three different cities. Only Gunderson and Klemhauser worked in the same building.

After a week, I had a lot of documentation on the ad messages. Checks on lower security levels showed that they never talked about them unless they were on top security. I got hard copies of everything, but this was just a sidelight. I was interested only in Grampa. Who killed him? Who was going to have to pay? I hadn't hacked into their system until long after the funeral, so there was no way for me to check on any planning they had done. And the longer it went, the less likely it was that the subject would come up.

That night, I had a terrible dream. I dreamed I was walking in a meadow with Grampa, and we were talking and laughing and having a great time. I was feeling really good but all of a sudden four men jumped out from behind a bush and attacked Grampa! I tried to help him, but I was frozen with fear, and couldn't move. I watched helplessly as they killed him. Then I looked back at Grampa's body, and it was already in a casket, and we were in church at the funeral.

I woke up, shaking. The last image was so strong, so vivid, that it took a long time to shake it out of my mind. It was horrible! The picture of Grampa, lying dead in his coffin, just haunted me! Me, who had nothing to feel guilty about! It was too bad that his killers couldn't have that kind of nightmare.

. . . I'll bet I could give it to them.

Mom is real big about documenting the family history, and had taken pictures at Grampa's funeral. I got up and snuck downstairs to get the photos. I grabbed the whole bunch and went back upstairs. I booted up my computer as I steeled myself, and then went through them.

When I got to the picture of Grampa, it was like an electric shock. My hands shook, and my vision got blurry as I stared at him, lying so stern and dignified, dressed in his best suit that he rarely wore, lying dead in a coffin.

I opened up my computer scanner and put the picture in it.

Somebody was gonna be sorry.

The four conspirators had scheduled a big teleconference three days from then. I did an enormous amount of research during those three days, bugging the heck out of the computer instructors after school. They all seemed glad to help, and were real surprised to be working with me. As a matter of fact, school had improved quite a bit. Nobody bothered me now. Some of the guys who had also been bothered by Heber said "hi" to me in the halls. Lots of people looked at my heavily bandaged left fist with admiration. I'd only seen Heber once since I got back, and his face was swollen and puffy.

I went up to my computer teacher after class, and started firing questions at her.

"I didn't know you were so interested in computers," she told me.

"Yeah, I'm really into it," I told her. "My grampa worked for Advanced GameTek, and we did a lot of hacking around together. Multi-media, 3-D programming, that kind of stuff."

She shook her head. "Well, you're wasting your time in this class. You should be in one of the advanced programs. Let's arrange a placement test for you, to see where you should be. Someone with your skills should be much higher up."

I don't know why, but the thought was kind of exciting. We talked for awhile longer, and then she sent me to another teacher who was the advisor for the computer club. He and I got along real well, which was surprising, since I don't interact with adults very well. I gave him a censored version of my idea, and we worked out a lot of technical details.

"Have you ever thought of joining us in the computer club?" he asked. "We meet once a week and have a good time. We have professionals come in and talk with us sometimes. And the club is almost half girls. You'd like it."

I'd never joined anything in school before, and so it surprised me that I was actively considering it. I wrote down the details of when the next meeting was, and left.

On the day of the teleconference, I pretended to have the flu. It took forever for my mom to stop fussing around me and go to work, and then I finally had the house to myself.

When the conference started, I felt really creepy. It was like it was real! I was sitting in a virtual boardroom, in one of the chairs around the conference table. Four men were sitting around me, but they didn't look at me, they didn't notice me. It was like I was invisible! I looked from one to the other and held my breath, squirming with discomfort.

They sat right next to me, arrayed around the table. The virtual reality removed the helmet they all had to wear, and gave an active picture of their faces instead. I sized them up while they made small talk.

Klemhauser, the chairman, was a balding man with an oversized mustache. He kept making lame jokes, and everyone else laughed much too loud. *They must be afraid of him,* I thought. *They're all trying to kiss his butt.*

Hawkey was a little mouse of a man who kept looking darkly at Van Ives and anxiously at Klemhauser. Everything he said, even the jokes he made, were forced and stilted, like in a bad movie I'd seen about business people. He avoided Gunderson's gaze.

Van Ives was a fat man with a sweaty red face. His voice was so loud that I wondered if his helmet needed adjusting, but nobody mentioned it. He told long, pointless stories with great enthusiasm and enormous volume. He kept glancing at Gunderson, trying to exchange smiles.

Gunderson sat immobile, and laughed only when Klemhauser made a joke. His craggy face, with flinty, cynical eyes, swept the other two subordinates with stony indifference. *He's the hatchet man,* I thought. *He's the most dangerous one.*

I had the teleconferencing monitor on "record," and it responded to my head and eye cues to show whatever I was looking at.

Klemhauser started the meeting by talking about budget cuts. "These cuts are necessary," he said, "because we're channeling a lot of money into our new advertising project. This is the first time we've attempted this kind of subliminal advertising, and it takes a lot of research to perfect it. We also have to monitor it extensively, to see if it's having the effect we want, and we're channeling a large proportion of the money into a legal and P.R. defense fund in case we're ever discovered."

"What will our official story be, if that ever happens?" Hawkey asked.

Klemhauser glanced at Gunderson, who answered. "Our position is that software packets similar to this one are used in virtually every virtual reality game. It merely is used to enhance the *savoir-faire* of specific characters. It's an embellishment that shows our commitment to making the best virtual reality games in the world, and any charge that it is youth-oriented advertising is preposterous raving from radical fringe groups—the same fringe element that objects so stridently when smokers exercise their right to enjoy a legal product that's never been proven to be harmful."

They all nodded, satisfied. Van Ives had a slight grin. "That's very good," he said. Gunderson glanced at him expressionlessly.

"What is the awareness of our project?" Klemhauser asked.

"Zero," Gunderson said flatly. "Nobody knows. And the code is so buried in the games that nobody could find it, even if they could break into the game's underpinnings."

"What about the software team that developed it?" Van Ives asked.

Hawkey leaned forward. "Each member of the team has been promoted beyond their experience and educational levels. Personnel reports that they are all living lifestyles in accordance with their inflated salaries. Simply put, if they lost their present jobs, they'd never get anything else that's close. They'd be ruined financially."

Everyone else nodded and made approving noises. Klemhauser said, "Any other security concerns?"

There was silence for a moment, and then Van Ives said, "There was that potential leak at Advanced GameTek." He looked keenly at Hawkey.

Gunderson spoke up before Hawkey could answer. "That's been taken care of," he said flatly.

"No comebacks?" Van Ives persisted.

Gunderson shook his head with finalty, while Hawkey looked uncomfortable. I quickly targeted Hawkey and hit my "implement" button. He jumped visibly with shock and surprise as the picture of Grampa in his coffin was flashed before his eyes for a fraction of a second. Everyone looked at him.

"Are you OK?" Klemhauser asked.

"Yeah. Sure." Hawkey looked visibly shaken.

"Well, I'm glad there are no loose ends on that issue," Van Ives said. I targeted him, and hit the "implement" button again. He opened his mouth to say something, and closed it again. "I—uh—I wish it hadn't been necessary."

"None of us wanted it to happen," Klemhauser snapped. "But we all agreed that it was necessary. Let's move on, shall we?"

They hastily moved to other subjects, everyone seeming considerably subdued. I waited for ten minutes or so, and then hit Hawkey again with Grampa's picture. This time, someone else was talking, and nobody noticed as he jolted again.

Another ten minutes, and the meeting began to wind down. I rigged the system to give all of them a flash of the picture just as they turned off their helmets, so they wouldn't be able to tell that they each got it at the same time.

They ended the meeting, but I stayed connected in case one of them got back on. None of them did. I wondered what was going through their minds, but had no way to tell yet. It had all been very exciting, but kind of unsatisfying at the end. I activated the automatic monitoring program, and turned off my helmet.

A picture of my Grampa in a casket had done some pretty impressive things to these corporate bigshots. But it was a fairly static image. It seemed to me that I could do a lot better than that if I really gave it some thought.

I spent a lot of time, a lot of research, and a lot of thought on the new dream I wanted to give those guys. It took days, working on it during school, thinking about it during class, getting rebuked by all of my teachers, developing it before school, after school, and late into the night. In the meantime, I kept using the picture of Grampa in his casket until I had something better to jolt them with. And when I finally finished, I was kinda proud of it. I wondered if anyone else in junior high would be able to do something like it.

I was walking with my best friend in a beautiful meadow. We were having a great time, laughing and joking and enjoying each others' company. All of a sudden, a huge hole appeared in the earth, and he

fell into it! I stared in disbelief as he screamed in fear, grabbing a branch that kept him from falling into the infinite depths. "Help me, help me!" he cried, and I felt incredible urgency and fear for my friend, my best buddy, my pal.

All of a sudden, I looked at him, and it wasn't my best friend—it was Al Melfred instead! But I felt the same urgency about saving him, because I felt about him like I felt about my best friend! But then the branch broke, and he fell and fell and fell, and he screamed and screamed and screamed, and all I could see was his face as he fell to his death!

I stared down the hole, not able to believe the horror of what I'd just seen. All of a sudden, a hand grabbed my shoulder from behind. Yikes! It almost scared me to death! I whirled around, and there was Al Melfred staring at me with the face of death. "You did this to me," he said.

I peeled the virtual reality helmet off my head, and wiped my forehead. I'd designed this, I had known what it would do, and it still scared me to death. It made me feel awful. This oughta do quite a number on those jerks.

Over the course of the next few days, I planted the nightmare in all four of them several times when they were using e-mail. Hawkey seemed to be my weakest link, so I hit him with it most often. And a few days after I started it, I came home from school and saw that I'd shaken something loose:

HAWKEY: WHAT'S THE STATUS OF THE PROBLEM YOU ADDRESSED LAST MONTH?

GUNDERSON: COMPLETE.

VAN IVES: ANY FOLLOWUP? ANY REPERCUSSIONS?

GUNDERSON: NONE

HAWKEY: IT'S BEEN BOTHERING ME LATELY.

VAN IVES: ME TOO.

GUNDERSON: RELAX. THERE'S NO PROBLEM HERE. NOBODY SUSPECTS A THING.

HAWKEY: ARE YOU SURE?

GUNDERSON: WHAT'S YOUR PROBLEM?

VAN IVES: I'M CONCERNED ABOUT SOMEBODY FINDING OUT ABOUT IT.

GUNDERSON: I CHECKED INTO THE CORONER'S REPORT. IT'S OFFICIALLY LISTED AS A FATAL HEART ATTACK. THE KILLER SOFTWARE ERASED ITSELF AFTER RUNNING. THERE'S NO TRAIL. KLEMHAUSER IS PLEASED. FORGET ABOUT IT.

I made a copy of that exchange, like I'd done for all of them. They were in my computer, and hard copies were stuffed into the hole in the tree that only me and Grampa knew about. I knew what they were talking about, but I wanted to have solid proof that would stand up in court. Or maybe for my own peace of mind. When I killed whoever was responsible, I wanted to be sure of it before I did it.

Oh my God there's a man with a ski mask jumping out of the shrubs and he's got a gun and no don't shoot and the sound of the gunshot ruptured my eardrums and the blast caught me in the chest and I was on the ground and everything went dark!

I peeled off my helmet, breathing

hard. I had reduced the reality setting before previewing the packet that had killed Grampa, but it was still pretty powerful stuff. At full power, it would probably do the job on all four of those corporate guys.

It had been easy to lift that packet from Grampa's Virtual Meadow recording and put it into my computer. I could trigger it any time I wanted. I just had to find out who deserved it.

And then I'd be done, and nobody would have a clue.

The next day in school, I followed Tiffany Montgomery from our computer class again. This time she was wearing a short, tight skirt with a leopard pattern. I wondered where anyone came up with so many skimpy skirts. I also wondered what her parents were like, to let her wear that stuff. Not that I was complaining.

Since computer class had been so boring, I'd spent the time thinking about killing Grampa's killers. I was feeling pretty bloodthirsty about it.

My mind had wandered from Tiffany's skirt, which was lucky. I looked to one side, and saw Bruce Heber and his friends glowering at me from the side of the hall. Instinctively, I looked down, and then caught myself and looked back at him. His face was still lumpy and puffy, with red tinges around his nose and mouth. The bloodthirsty attitude brought about by Grampa's killers stayed with me long enough to give me some courage. I stopped walking, and looked at him.

"What's your problem, Heber?" I said.

"What's yours?" he shot back.

I didn't have a snappy answer, and was keenly aware that noise had died down considerably in the hall. I scrambled for something to say.

"Any time you wanna try again, you just let me know," I said.

He glowered at me, but didn't say anything. I turned and walked away, my back feeling very exposed. I noticed Mary Adams and some of her friends watching with wide eyes, and it felt good. I passed a couple of other jerks who weren't as tough as Heber, but who used to bother me sometimes. They glanced at me quickly, and looked away as they kept walking.

Johnson and Andrews were walking together, and they came up to me.

"Hi, Walters," Johnson said.

"Hi, guys."

They walked with me in silence for a minute. Then Andrews said, "Heber's face looks like a roasted marshmallow."

Johnson and I laughed in surprise. Johnson said, "It looks like someone danced the polka on it."

I laughed again. "And the worst thing is, it looks better than it did before."

All three of us laughed, which felt good.

"Hey," Johnson said, "if we pick up the pace a little bit, we'll be able to see Tiffany Montgomery from behind."

"You've noticed her too?" I asked.

"Hasn't everybody?" Andrews answered.

We all chuckled, and walked faster.

* * *

BARGAINING

I walked home from school, feeling pretty good. I'd gone through the whole day without being bothered or humiliated—not once. I couldn't think of the last time that happened.

I was making progress on finding Grampa's killer. And I was ready to retaliate, as soon as I was sure of my target. The best part of it was, nobody would ever suspect a thing.

I smiled dreamily. I'd learned a lot. I'd taught myself a lot of new stuff. And I was going to kill the person who'd killed Grampa. I would have liked to tell him about it.

I slowed down, my smile fading. I could imagine myself telling Grampa all of this. But it didn't seem right. It didn't work in my mind. I kept picturing Grampa's disapproving frown, which I had seen, although rarely used against me. But in my mind, it was directed at me now.

"Hmmmmmmm," I could hear him say. "That doesn't sound like the Greg I know. Don't go killing anyone on my account. I don't want that on my conscience. Or yours, either."

I stopped walking, and kicked at the sidewalk for awhile. I didn't like this. I didn't like it at all. I wanted them to feel what Grampa felt. I wanted revenge for how I felt. I *wanted* to kill them.

But the more I thought about it, I knew Grampa wouldn't like it. And if I ever saw him again, somewhere, I wanted to be able to look him straight in the eye like I always had. And I wanted to see his crinkly smile as he looked back, two equals who had the highest possible opinion of each other.

I sighed a sigh of deep regret, and looked skywards. "OK, Grampa," I said out loud. "I won't kill them. I promise."

I felt better. I hurried home, because I had a lot to do before everything was finished. I slipped past my mom with no trouble, and went up to my room. I quickly booted the computer and reached under the mattress for Grampa's notes.

They weren't there.

I felt around, and then lifted the mattress up. There was the lingerie catalog. I looked underneath it. Nothing. I rooted frantically under the bed, and between the bed and the wall. Nothing.

Grampa's notes were gone.

In a panic, I tore through my room. Maybe I'd left them somewhere else, even though I knew I hadn't. Rooted through my drawers. My God, they're gone, who would have taken them, what does this mean? I could probably do without them now, but how could they have disappeared?

Someone knocked at my door, and I quickly shoved the drawers shut. "What?" I called.

My mom opened the door, and looked searchingly at me. "Hi," she said.

"What?" I asked again. I'd been told that it was rude to say "Whattayawant?" I cast my eyes over the room, trying to figure out somewhere else I might have left those pages.

Mom brought her hand out from behind her back. I stared in shock at Grampa's notes in her hand. She held them out. "Looking for these?"

I stared at them, helpless.

"What are these?" she asked.

I worked my mouth uselessly. "What—how—"

"I found them under your mattress," she said. "I know it's a horrible thing for a mother to do, but I was so worried about you these days that I decided I'd see if I could find out what was going on in your life. I expected to find the lingerie catalog, but I didn't expect to find these."

The lingerie catalog. The implications flooded me, and I stared at her with shock and mortification. My face turned flaming hot, and I knew it was bright red. "The lingerie catalog—I—it—there's this article—on—on—"

She smiled slightly. "Relax," she said. She touched my flaming cheek with a cool hand. "The catalog means you're a normal teenager. Every boy has a magazine like that, and they all hide it under their mattress. Your dad told me about the *Playboy* he had under his when he was your age."

My *Dad??*

She showed me Grampa's notes again. "But then I find these technical notes, with my dad's handwriting all over them, and you're busy on your computer all the time. What's going on?"

I shrugged sullenly. "Nothin'. Just hacking around."

I sat on the bed, looking at my feet. There was a long silence.

"Listen," she said finally. "I've been having a hard time lately. My dad's death has hit me real hard."

Yeah, well, me too, I thought. But I looked at her in surprise. I didn't think adults had problems like that.

"Some things just never made sense to me," she went on. "At first I thought, the death of a loved one never makes sense. But I can't get over the fact that some little things just don't add up." Her voice was getting a little choked up, and I quickly looked at the floor again. But she wasn't finished. "It's been keeping me awake at nights, it's been keeping me from functioning normally, it's caused problems between your father and me." I looked at her quickly, shocked into concern. Her eyes were brimming with tears as she looked at me. "Please," she said. "I really need to know."

I'd never thought of my mother as a real person before, and it was a very unnerving thought. I stared at her as my mind reeled to adjust to this new reality. Suddenly, I realized what a relief it would be if I could just tell somebody about it.

"Somebody killed Grampa," I blurted. "He was murdered. And I'm going after whoever did it."

I thought she'd ground me for a year. I thought she'd call the police. I thought she'd forbid me from ever touching a computer again. I thought she'd do a lot of things, but I never thought I'd sit there and watch as her face crumpled into the most horrible grief I'd ever seen.

It seemed like hours. It seemed like weeks. It seemed like it was forever as she sat on my bed and sobbed and sobbed and sobbed. I sat next to her and didn't know what to do. I finally put my arm around her, which was the first time in months that I'd touched either of my parents willingly, and I tried to think of what my dad did when she cried, but I didn't know because I'd never seen *anyone* cry like this before, much less my mom. After awhile I realized that she was crying because Grampa was gone, and someone had taken him away from us before it was time, and I'd been so busy plotting my revenge that I'd kind of forgotten that, then I started crying too.

After awhile, she got up and brought back a box of tissue. We both sat quietly for awhile, sniffing and blowing our noses, and then she asked, "How do you know he was murdered? And what do you mean, you're going after the people who did it?"

I told her the whole story, and let her see some of the stuff I'd collected. It didn't take long to convince her I wasn't making it up.

"What's your plan?" she asked.

"I don't know," I admitted. "When I get enough proof, I guess I'll turn it over to the cops."

"You're dealing with killers," Mom pointed out. "This can't be safe."

"It's completely safe," I insisted, realizing why I hadn't told anyone about it before. "Grampa rigged it so I'm completely invisible. They don't have any idea that I'm there. And I'm recording everything so I'll have some solid proof. And if anything goes wrong, I just turn off my computer, and—poof!—I'm gone."

"Shouldn't we tell someone about it now? And then supply the evidence when we get it?"

"I've given this a lot of thought, Mom," I said. "If there's the slightest hint that someone is on to them, they'll bail out. Go somewhere else, someplace where Grampa doesn't have a bug. And then we'll never be able to catch his killer."

"But a computer professional of some kind could help out," Mom insisted.

"Name one you could trust not to rat on us," I challenged.

She didn't answer.

"Face it," I said. "We're messing with a big company, with lots and lots of money. You said they own half the senators in Washington. I don't trust anybody to be on our side. Nobody."

She sat in silence for awhile, and then nodded. "You're right. See, I keep telling you, you're a very bright boy." I grimaced, and she continued. "You can keep on doing this," she decided. "I'll tell your dad about it, but nobody else. Just keep me informed and for heaven's sake, be careful!"

"There's no risk here," I assured her.

"Just so you're careful," she repeated.

"I promise."

"One more thing," she said, and stood up. "Get the bastard who killed your Grampa." She tossed the notes on the bed and walked out of the room.

Another memory I have of Grampa involves a fire truck he gave me for my seventh birthday. It was the neatest fire truck I'd ever seen, because it had two detachable hoses. One of them would fit a water faucet, and you could turn on the water and use the other hose to aim the water flow. I thought it was just absolutely the coolest thing in the world.

Mom would never let me play with the hose attachment, but once when Grampa was babysitting while my parents went out, he had me take it out to the garage. Then while I hooked it up, he got a cardboard box and used a magic marker to draw doors and windows and a roof onto the box. And then he set it on fire! It was up to me and my cool fire truck to put out the fire in the "house." It was the biggest thrill I'd ever had.

When my parents came home and I told them about it with high excitement, my mom was mortified. She'd envisioned all kinds of fire catastrophes I would cause because Grampa had done that. So I had to put up with a lecture on fire safety. Sitting there sandwiched between my mom and dad, I looked over at Grampa, sitting across the room. And he smiled crinkly-eyed at me, and I smiled back, and we both knew that the thrill of the fire was worth any kind of lecture we got.

I kept on monitoring the high security channel. I was especially interested because Klemhauser and Gunderson had summoned Hawkey and Van Ives to a face-to-face meeting at their office. I had no way of knowing what they talked about, so I was eager to eavesdrop on the post-meeting messages.

They all seemed pretty routine, and I didn't understand a lot of them. But I was pleased to see that they were scheduling another teleconference. I figured I could catch up on where they were in the ad campaign when I monitored that.

I was pretty sure that my electronic nightmares would have had some effect by now, and they'd talk about Grampa in more detail tomorrow. Then I'd have all of the evidence I needed. I'd have to skip school again, which was fine with me. The nice thing about my mom knowing what was going on was I didn't have to fake an illness.

I told my mom about the teleconference the next day, and she granted permission to stay home and monitor it. She wanted to stay home too, but I assured her that it wasn't necessary. She would have insisted, but she had some big project at work.

So I was alone in the house again, which was the way I liked it, when the teleconference began. I was pretty used to the setup now, and sat smugly in my invisibility as the others gathered around the table.

"Let's get this underway," Klemhauser said abruptly, bringing the meeting to order. I glanced around at the others. They all looked haggard and tense.

"We all know why we're here," Klemhauser continued. "None of us has been sleeping well. We've all been having nightmares. As a matter of fact, we've all been having the same kind of nightmares. And we've all been seeing the same images. Exactly the same." He paused for dramatic effect, while I listened breathlessly. He reached under the table and brought out some kind of switch. "Yesterday, we found out why. And now, let's find out *who!*"

I watched uncomprehendingly as he flicked the switch. Then they all cried out in surprise. Hawkey jumped a foot, Gunderson and Van Ives swore, and they all stared directly at me!

"Oh, Jesus!" Hawkey yelled. "He's right next to me!"

"Shit!" cried Klemhauser at the same time. "There really is somebody!"

I sat rooted, immobile with shock. I stared back at them and just about crapped in my pants.

Gunderson was looking behind me. "Hold him!" he roared. Hawkey and Van Ives each grabbed one of my arms and held me immobile. I wasn't really there—I was sitting alone in my room—but I couldn't move—I couldn't get away—the only thing my brain knew was that someone was holding my arms!

Gunderson scrambled around the table, pushing people out of his way. He hit me across the face, hard. My head snapped around and my vision blurred with pain. "Who are you?" he roared. He hit me again, and I would have fallen to the floor if I hadn't been held. *Get out, get out,* I was telling myself. *Kill the connection!* But they had me. I couldn't move.

Gunderson grabbed me by the throat. "Listen, you bastard," he hissed. "The only way you're getting out alive is if you cooperate! Now, start talking!"

I stared at him. Every line in his face screamed "hatchetman!" And as I looked into his eyes, I knew. I knew for dead certain. "You did it," I said. "You killed Al Melfred."

"Oh, Jesus!" Hawkey wailed. "Somebody knows!"

"How did you find out?" Van Ives demanded. "How the hell does he know?"

"Shut up, both of you!" roared Klemhauser.

I kept looking at Gunderson, who was backing away. "They approved it," I told him, "but you did it. You were in charge of the project."

Gunderson reached under the table and pulled out something. I stared helplessly as he raised it up, and I saw it was a sawed-off shotgun. "Step aside," he snarled at Hawkey and Van Ives, and they moved away from me, but didn't let my arms go.

I stared down the barrels with wide eyes, and opened my mouth to protest. Gunderson triggered both barrels right at my chest from a distance of four feet. It felt like a mule kicked me with both feet, and the impact roared and echoed in my ears and my chest disintegrated into a shower of crimson blood. I was hurled backwards, and they must have let me go because I slammed back into the wall and my head hit the corner of something hard that might have been the dresser in my bedroom. Gunderson shot me again, but the sound and the pain was duller and farther away, and the image wasn't nearly as clear; as I slipped slowly away I kept thinking, *sorry Grampa, so sorry, I'm so sorry....*

"He's coming around," a strange man's voice said.

"Thank God," my mom's voice said.

I tried to see, but couldn't. A searing pain cut through my head, and I groaned.

"Take it easy," the man's voice said. "You're got a slight concussion. Lie quietly."

"Wha . . . ."

"It's OK, Greg," Mom said. "I came home early to see how it went. I found you unconscious. This is a paramedic."

"Your heart was going a mile a minute," the paramedic said. "I've got you on a sedative."

I tried to talk. I had to talk. "I—it—"

"Shhhhh," Mom said. "Lie still."

I screwed up my nerve, and flinched as I felt for my chest. I took several seconds to realize that it was all in one piece, even though it was throbbing in pain.

"His heart's taking off again," the paramedic said. "Maybe I'd better give him a stronger sedative."

"Mom!" I whispered.

"Yes, honey."

"It was a trap. Turn off . . . the computer . . . ."

My mom sprang away from the bed, and quickly returned. "The computer's off, Greg. Now, lie still." She must have turned to the paramedic. "Is he going to be OK?"

"If I can just get his heart rate to stay down," the paramedic said, rummaging in a bag.

"Mom!"

"Yes, Greg. You've got to calm down."

I was slipping down into a soft bed of pink cotton candy. "They know . . . where we are. Call police right now."

"I'll call 9-1-1 right now," Mom said, and sprang away from the bed again.

"Well, what do you know?" the paramedic commented as I slipped into a deep, drugged sleep. "His heart's calming down."

When I woke up again, my mom and dad were sitting by my bed, looking down at me. "Here he is," my dad said softly. "How you doing, Greg-man?"

"How are you feeling, honey?" Mom asked.

"Sore," I muttered thickly. "What day is it?"

"It's just afternoon," Dad said. "What happened?"

I tried to sit up, but decided it was a really bad idea. "Are the cops here?"

Mom smiled grimly. "Yes, they're here. You said something about a trap?"

I sighed and closed my eyes as I remembered. "Yeah. They figured out what I was doing, and must have gone in to the teleconference system to look for Grampa's bug. They must have found it."

"How would they figure out what you were doing?" Dad asked.

"I made a mistake," I muttered. "I think it was that I gave the same images and the same nightmares to all of them. They must have compared notes sometime when they were meeting in person. Then they had their own software people work up the trap. Am I gonna be OK?"

"The paramedics say you'll be fine," Dad said. "They say you got quite a shock. They said it's lucky you're so young and resilient. If you'd been even twenty years older, this would have killed you."

"Oh, wow. Wow."

"The police are waiting to see if you want to make a statement," Mom said.

"Yeah," I said. "They were all in on it. All four approved Grampa's murder. Gunderson oversaw the programming, and switched the disk."

Mom got up and poked her head out the door. "Officer! Could you come here, please?"

I talked for an hour. When I finished, the office said, "I'll take the evidence with me, and we'll start making arrests."

We watched him drive off, and then my dad went to the phone.

"What are you doing?" Mom asked.

"If they're making arrests tonight," my dad said,"I thought it would be nice if the news cameras were there to record the events."

Mom smiled at the thought. Then she said, "Why should we watch it on TV? Why don't we show up in person?"

Dad laughed. "Good idea. I'll just make sure the rest of the country sees it on TV."

I hadn't seen them laugh together in a long time.

"Won't they be done by the time we get there?" I asked. "The cop said they were going to start making arrests."

"Nah," Dad said. "He may have said that, but they'll need more time than that. They have to review the evidence, and get an arrest warrant signed. I think we've got time."

Hawkey's office was in the Advanced GameTek building. We drove there, and went to the executive floor to wait for the cops and reporters.

Mom brought her camera.

We sat in a waiting area on the executive floor, with mom instructing us to look inconspicuous. "I want to see this," she whispered. "I don't want security people or policemen sending us away." I hunched down in my chair, and watched my dad do the same. Nobody seemed to notice us.

Fifteen minutes after we showed up, the elevator opened and disgorged two cops and a camera crew. As they stepped out of the elevator, every eye on the floor turned to look. The hardwood floor echoed under their footsteps as they strode down past the rows of secretaries' desks toward Hawkey's office. We walked over there too, hanging back enough to be unworthy of notice. Hawkey's secretary stood up as everyone approached, her eyes wide and her mouth open. The cops unbuttoned their gun holsters.

"What's going on?" she asked.

"Is Mr. Hawkey in?" the first cop asked. She nodded mutely.

The cops opened the office door and stepped inside. "Mr. David Hawkey?" the first cop asked in a voice loud enough to be heard all over the floor.

An unintelligible answer came from inside.

"We're police officers," the first cop continued. "You're under arrest for the murder of Al Melfred."

His secretary's face turned white as a sheet, and she sank into her chair, her mouth forming a perfect "O."

The cops moved farther into the office. "Step away from the paper shredder," the second cop ordered. "Hold out your hands." We heard the unmistakable sound of handcuffs being applied.

My mom stepped into the middle of the hall and called out in a loud voice, "Can I have your attention please? Everyone come out into the hall! It's extremely urgent!"

Office doors opened by the dozens, and heads appeared just in time to see Hawkey led out of his office in handcuffs. The first cop was saying, ". . . If you give up the right to remain silent, anything you say can and will be used against you in a court of law. You have the right to an attorney . . . ."

Hawkey looked positively ill. He stared wildly with frankly appalled eyes, and dozens of people stared back. My mom started taking pictures. The reporter dashed forward, wielding a microphone.

"Mr. Hawkey! Why did you kill Al Melfred?"

Hawkey stared at her with sick eyes. He worked his mouth feebly, but no sound came out. But everyone who had overheard the question was shocked and appalled, and I heard an alarmed buzzing: ". . . Killed Al Melfred! . . . I thought it was a heart attack! . . . Why would he do that? . . . Al was the nicest man . . . ."

Hawkey was led through a corridor of staring eyes and shocked faces—the camera focused on his face, the reporter barking questions, and my mom taking pictures. I walked in front of them, drinking in the look on his face. It was what I'd wanted to see for a long time. It was satisfying and triumphant, but it was all necessary because Grampa was dead, and I felt a light stinging behind my eyes.

The cops didn't allow us in their elevator, so we took the other one and beat them down into the lobby. A horde of people had gathered, and watched in silent shock as their president was paraded past them in handcuffs.

The videotape made the late night news, complete with an information packet my dad supplied. The next day, it was the second story on the national news. I watched as Van Ives, red faced and perspiring, was dragged out of his office, shouting loudly. Klemhauser, feebly attempting to pretend that nothing was wrong, was trying to joke with reporters as he was led away. There was some great footage of Gunderson being tackled as he tried to run to his car, and being subdued by police. Since I had told them that Gunderson was the dangerous one, ten cops were on hand for his arrest.

They were all being held without bail. Camera crews ambushed their attorneys, who had nothing to say.

ACCEPTANCE

The interviews lasted for days. National networks carried the story, with clips of the subliminal ads, looking lousy on plain old TV, and clips of me explaining everything. Coast to coast, people saw the gunman who had killed Grampa, and they also saw Gunderson firing the shotgun into my chest. My mom was the most active speaker, and her comment that "in some corporations, only the scum rises to the top" was aired over and over again.

Advanced GameTek and SKS Holdings disavowed all knowledge of the activities of the four conspirators, fired all four of them, and did everything they could to distance themselves from the whole fiasco.

"Why did they do that?" I asked Mom and Dad. "Why didn't they use the legal defense fund they were gathering?"

"It wouldn't do any good in the face of such overwhelming evidence," Dad explained. "It was meant for things like disputing charges that their ads were aimed at kids; that kind of thing. It was never meant as a cover for murder."

Mom agreed. "All the company can do now is try to cut their losses, and leave those four as scapegoats. They're hoping that the public will be satisfied with that."

They weren't. The TV news magazines did segments on me and Grampa, and a few senators came to get first-hand experience with the ads that were placed in the virtual games. A rash of new legislation was introduced to severely limit tobacco ads of all kinds, along with a bunch of other legislation on the industry.

Back at school, everybody noticed me now. I was kind of a celebrity. Even the to-die-for Tiffany Montgomery favored me with a few glances, and looked straight at me once. I looked right past her, and walked over to Mary Adams.

"Hi," I said.

"Hi!" she said, surprised.

"I wanted to tell you I'm sorry for being rude when you talked to me about my Grampa," I said.

"Oh, that's OK," she said, not sure what to say.

"I appreciated the thought," I said. "I was just so sad I didn't know how to act."

She squeezed my arm. "I understand. Don't worry about it."

The next step was still quite a plunge, but it wasn't as hard as I thought it was a few months ago. "I was—uh—I was wondering if you'd like to go to a movie with me sometime."

Her face lit up. She really was quite pretty. "Sure!"

We arranged the details, and then the bell rang for the next class. "I'll see you later," she said, moving off.

"Sure." I stood smiling, and watched her walk away. Then I headed to class. I walked right past Tiffany Montgomery, but I didn't even glance her way.

With everything over, I was able to think about the good times with Grampa again. Before every date with Mary, I'd look skywards and smile, because I knew that Grampa was up there, rooting me on. He'd have liked Mary, and he'd have liked the fact that I had a girlfriend.

Thinking about the good times was Gramma's suggestion, and it helped me deal with the fact that Grampa was dead. I wondered if she did the same thing, but who knows how adults handle stuff?

One of the things I kept thinking

about was that fishing trip when I was five. I wondered what happened to that picture that Grampa took of me, with the huge galoshes, enormous hat and innocent expression. I asked Gramma about it, but she didn't know what happened to it. So I looked around Grampa's house, and our house, to see if it was anywhere. Gramma even went through Grampa's wallet and stuff, but it wasn't there.

Everybody in the family had got involved in the search after awhile, because it was Grampa's favorite picture of his grandson. And everybody was real disappointed when I gave up, and said it was nowhere to be found. My mom, especially, she was bummed, because it was her dad's favorite picture of her kid.

I don't know; it's weird. After the first disappointment, it never really bothered me that I couldn't find it. I was kind of glad that it disappeared when he died.

I like to think he took it with him. ■

The first principle is that you must not fool yourself—and you are the easiest to fool.

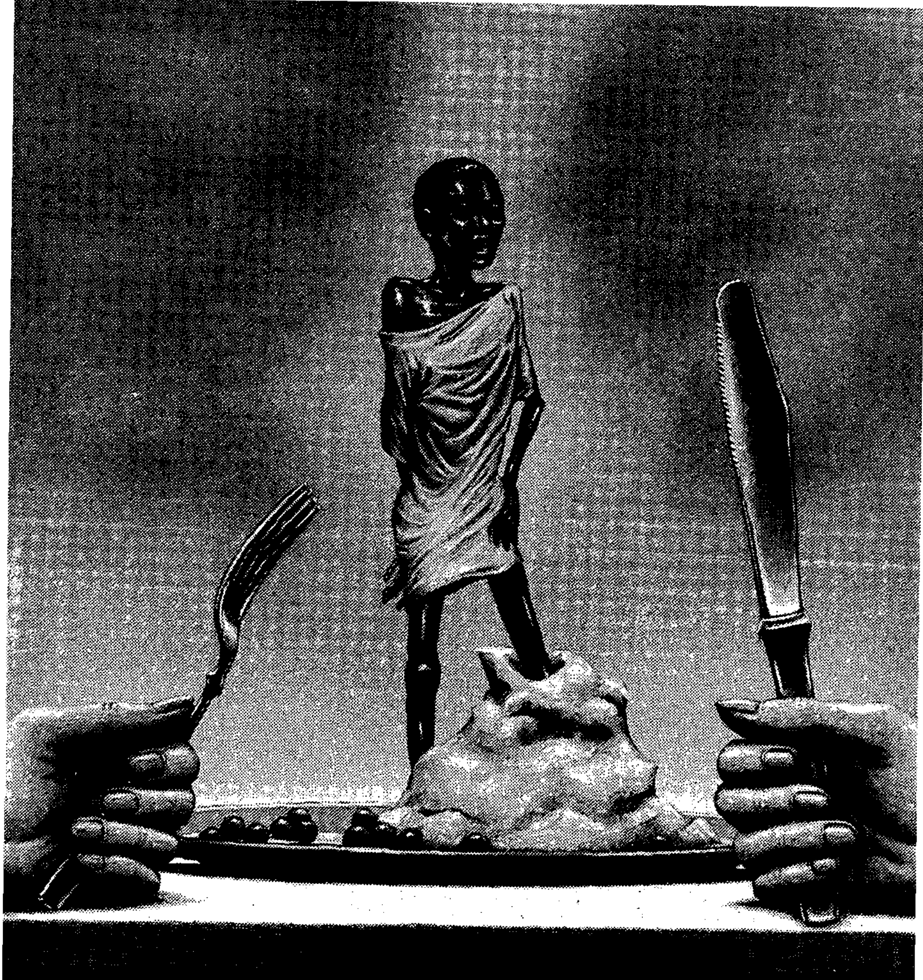
—Richard Feynman

The right to be heard does not include the right to be taken seriously.

—Hubert Humphrey

A wise man will make more opportunities than he finds.

—Francis Bacon



Linda J. Dunn

OVEREATING FOR A WORTHY CAUSE

What people need and what they want are two different things—and neither can be ignored.

Illustration by Alan M. Clark

Johnny pushed the peas around on his plate, trying to make it look like he'd actually eaten some of them.

"John William Anderson!" His mother's voice had a plaintive whine that hurt his ears. "You eat every single one of those peas. Don't you know there are children starving in Ethiopia?"

He made a face and looked across the room at the chocolate cake in the kitchen. It was topped with fudge icing and Johnny knew there was ice cream in the freezer.

"I'll be happy to eat chocolate cake for them."

"Now, you know better than to play that game with me." His mother reached across the table and touched the top of his sym-bracelet. A hologram of Muhhammad stood before him in a pose that buried one of the skinny boy's legs in a mountain of mashed potatoes.

"Just look at that poor child. Nothing but skin and bones, and it's a full six weeks since we adopted him as your foster sym. You're not eating enough to keep the poor child properly fed, and you're not going to do it with chocolate cake and ice cream. Is that clear?"

His father cleared his throat and set down his knife and fork. "Actually, it doesn't matter what Johnny eats as long a his body takes in more nourishment than it needs."

"You mean the bracelet's just transmitting empty calories?"

"Calories? No, a calorie's a measurement of heat. It doesn't transmit heat."

"Then what is it sending?"

"Electrical pulses. They adapted the micro-converter—"

"Why don't we just send them the peas?" Johnny asked.

"Eat those peas!" Johnny cringed under his mother's glare and pushed a few of the nasty things onto his spoon.

"It only works on microscopic items. Things so small that you can't see them." His dad winked as he added, "But I think you've eaten enough tonight. I didn't have the doctor put that sym-bracelet on you to help some strange kid in Africa. I had it implanted to monitor your health and protect you from the family curse of obesity."

His mother pushed her chair back and stood up. "How dare you! No wonder the boy never minds me. . . ."

Johnny slid out of his seat and crawled under the table as they moved into their usual positions for an after-dinner fight. They wouldn't notice him slipping away. They never did.

He could still hear their angry voices as he grabbed two slices of chocolate cake and headed toward his room. As luck would have it, he had to pass by the refrigerator on the way.

Might as well take the whole container of ice cream and a large spoon for a scoop.

"Run, Ngai. Run!" Teresa Milner clapped her hands and shouted as the boys raced around the pole and headed toward her. Ngai won, and Muhhammad came in a close second.

"Very good, Ngai. You're doing

much better, Muhhammad." Neither one of the boys knew English but she liked to believe they understood her anyway. There was a lot to be said for tone of voice and body language.

The boys grinned, showing gaping holes where teeth should have been. Except for that reminder of malnutrition, they looked the picture of health. No one would ever know they nearly starved to death before the sym-bracelets were available.

She smiled at the irony behind her invention. When she was young, her mother always forbade her to leave the table until she'd eaten every single bite of her meal.

"There are children starving in India," her mother would say. So one day Teresa bundled up her food and dropped it in the mailbox.

Her mother grounded her for a week when she found out about that.

Sym-bracelets were simply a more sophisticated method for sending the excesses of the wealthy to those in need. The best part of the whole deal was that international relief agencies didn't have to beg for funding anymore. Overweight, affluent people stood in line to buy the sym-bracelets because it meant they could eat all they liked and not gain a single ounce.

She grinned with a little smug self-satisfaction at her perfect solution.

When I win the Nobel prize, maybe I should invest the money in chocolate factories. I could use the profits to build a few decent schools and hospitals out here.

A bell ringing nearby interrupted her thoughts. Lunchtime.

Good! I'm starved. Maybe I'm even hungry enough to eat that awful stew they've been serving us.

What a relief it'll be to get back home and eat some decent food!

Teresa waved at the boys and turned toward the gate that separated the workers from the natives; but as she walked away, something pulled her back. She turned and stared, realizing at last what it was that had bothered her these last few days.

The boys were leaning against the fence with their noses in the air, savoring the smell of that awful stew like it was pizza or something. Their mouths were watering and the eyes had that glazed look like she hadn't seen since wart-faced Billy had that crush on her in fifth grade.

And then it hit her. Right between the eyes.

They're hungry! The sym-bracelets have taken care of all their physical needs but they're still craving food.

She carried her bowl of soup outside and tried to share it with the boys. Within seconds, she had a riot on her hands as people swarmed over her like a pack of hyenas on a dead gazelle.

"That was a damn foolish thing you did," Dr. Ciurej said as he finished putting the cast on her broken arm.

"Why didn't you warn me, Dennis?"

"About what? Waving food under the noses of hungry people? I thought you were smarter than that. You certainly said as much every time I tried to persuade you that you needed to get out of the lab and see the results of your work first-hand."

Teresa lowered her arm and tried not to flinch as Dennis swabbed peroxide on her cuts.

"I guess I deserved that. I was so sure we'd finally succeeded after all those failures. Maybe I just didn't want to admit I blew it again."

Dennis looked up just long enough to smile. "Don't be so hard on yourself. You stopped them from dying."

"For how long?" Teresa bit back tears that had nothing to do with her injuries. "Now they're healthy, full of energy, and hungrier than you and I can even imagine.

"How long do you think it's going to take this country's petty little dictator to figure out he's got the most highly motivated source of soldiers in the world? And one that doesn't have to worry about stopping to eat?

"Boy, I sure did these people a favor, didn't I?"

Dennis shook his head. "You gave them a chance to live. If they choose—"

"But it's not their choice!" Teresa stood up and paced in a small circle. "Everything's constrained by politics.

"We wouldn't need the transmitting sym-bracelets at all; we could take the energy directly from the powersats. But no, the satellite owners aren't going to give their power away free.

"So I solve that problem by inventing something that has the rich begging for the opportunity to help those less fortunate and we use the satellite as a gateway with the minimum fee.

"It was supposed to be a win-win solution but I ignored the obvious. I didn't think about the psychological need to eat.

"A fool could have seen this coming!"

Dennis laughed softly as he twisted the cap back on the bottle of peroxide. "So how long are you going to sit here and berate yourself before solving this problem?"

Teresa shrugged. "It's hopeless."

Dennis shook his head as he handed her two pain pills. "This sure doesn't sound like the charge-ahead Terri I know."

"Well, right now Terri's tired and hurting."

"So take your pills. It'll kill the pain so you can get some sleep and tackle the problem when you feel better."

Teresa stared at him for a moment before turning her attention to the pills in her hand. A smile spread across her face and she gave Dennis a big hug. "I'm feeling better already."

Dennis stepped back slightly and folded his arms across his chest. "OK, Terri. I've seen that look before. What are you plotting now?"

"A small modification to the sym-bracelet. One that sends a false signal. We can drop a neural transceiver into both the symbiont and the host. When the host is full, the bracelet transmits a signal to the symbiont's brain that tells him that he's also full."

He laughed. "For a second, I thought you were serious. Take your pills, you're becoming delirious. The side effects for that kind of modification would—"

"Give all the third world nations an opportunity to catch up with their neighbors."

"Now I *know* you're hallucinating."

Teresa leaned forward and fixed a hard stare on him."Not at all." She took a deep breath. "It's no great secret that your main interest in this place is the tax write-off. That's a real upscale practice you've got back home and I bet your portfolio reeks of money."

Dennis shrugged noncommittally. "There's nothing wrong with enjoying the rewards of one's work. Not everyone's a bleeding-heart liberal like you."

"And what if I could show you a way we could both have what we want most? Would we have a deal?"

Dennis leaned back and stared at her before speaking slowly and softly. "If it was anyone else I'd tell them to take a hike. Let's take one together and you can fill me in on the details."

Teresa smiled and tossed the pain pills over her shoulder as they walked away.

John Anderson hesitated a second as he noticed a Hungry Warrior restaurant had moved into one of the old, abandoned restaurants near their condominium.

He didn't know why, but lately he found hamburgers rather bland and his body seemed to crave new, exotic food. African food.

His dad said it had something to do with a feedback loop in the new sym-bracelet linkup and some people were upset about it. The company that made the sym-bracelets offered to remove them free of charge but who'd want to accept that kind of offer? They'd get fat without the symbiont constantly siphoning the calories away.

John walked under the crossed spears that had replaced the golden arches in front of the restaurant, and opened the door. On the wall next to the menu was a holographic image of the company's founders, Dennis Ciurej and Teresa Milner, accepting the Nobel peace prize for their work in Africa.

He stepped up to the counter as a woman smiled and said, "May I take your order?" John didn't know why, but he had a real craving for a double order of banana mash. ■

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THE ALTERNATE VIEW G. Harry Stine

"WHO NEEDS IT?"

Comdex is a *wonderful* exposition! Everyone who is interested in technology should attend at least one of them. Comdex is the present showcase of high tech. It is where computer hardware and software manufacturers, vendors, and other types of mongers trot out their latest and greatest products. Some of these may not become commercial products if insufficient interest reveals itself at Comdex or a competitor unveils something better or glitzier.

Frankly, Comdex is the place where all the techie nerds gather to discover the latest toys they can buy for their computers. Comdex probably grew out of the swap meets that started in southern California in the 1970s when people began building their own computers. (Yes, Virginia, we used to have to do that because we couldn't buy a computer.)

For some strange reason, the general news media—network television, for example—cover Comdex. However, given the technological ignorance exhibited by their reporters, I haven't the slightest idea why they waste their time. Maybe it's just another excuse for a good party. Certainly, the television "reporters" are not techie nerds. In fact, most of them are technologically challenged, to put it in modern terminology. I know this from my own experience as the science consultant to a major television network news organization during the Apollo Moon landings. There I learned that, save for the technicians who labor like Morlocks behind the scenes and make television happen, most of the producers, directors, and reporters really don't understand how the pictures can be crammed down those little bitty wires. And I've heard them admit this on the air!

Old-time newspaper reporters gladly grabbed up the technology of the typewriter. Most of them could run a linotype or even hand-set type if necessary. They knew the technology and understood that their jobs depended upon the technology.

Times have obviously changed. Now it is chic to profess publicly an ignorance of the tools that make a television news reporter's job possible.

But I get real heartburn when I hear these idiots belittle and laugh at technology in other areas. It reveals to me how shallow and superficial these people are. Technology is the cornerstone of our worldwide civilization today because, without technology, only about 10% of the present population would survive. Life would be short, brutal, and difficult for the survivors. In fact, with fingers on thermonuclear triggers now, the survival rate might be as low as 1%. (Willy Ley ca. 1959: "There will always be survivors!")

Normally, I watch the evening TV news hoping to learn a little more about what's going on. (I get most of my input about current events these days from computer networks.) I discount a great deal of what I see and hear on such programs because I have different sources with different news filters on them. I'll listen with one part of my mind while reading or otherwise occupying the other parts of my grey matter.

However, on a recent evening while watching the NBC Nightly News, I saw Tom Brokaw displaying some of the latest gadgets at Comdex. Normally, Brokaw gives reasonable approbation to the new science and technology he reports. He certainly caught the real significance of the first flight of the McDonnell Douglas DC-X Delta Clipper on August 18, 1993.

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However, in wrapping up his coverage of the Comdex gadgetry, Brokaw asked a question that brought me right out of my chair with an explosion of epithets.

Brokaw asked his unseen audience, "Who needs this technology?"

That simple question revealed again the abysmal ignorance of most anti-technologists concerning progress.

Let me point out that history clearly shows that *nobody needs new technology.*

But they may and probably do *want* it.

Or they can be convinced that they want it.

Need and *want* are two different words that mean different things.

Techies may not understand this, but marketing people do.

Human beings *need* oxygen, heat, water, and food. Without them, human beings cease to exist in a very short period of time.

Human beings *want* shelter (usually a better-upholstered cave). A *want* is a desire. You can get along without something, albeit often not as well as you can get along if you have it. I could write this column longhand with a pen (and The Editor wouldn't accept it unless every other author was doing the same). I *need* paper and pen as tools in order to do it. However, I *want* to use a computer word processor because it makes the work easier and faster. (Damned right it's work! Try staring at a blank screen with a deadline inexorably creeping up on you!) My computer and printer also produce a manuscript that is easier for Dr. Schmidt to read and easier for typesetters to convert into the printed word you're reading. I suspect that in the near future I will be asked to deliver this column either on a computer diskette or via modem, thus eliminating the now-useless step of converting bits and bytes to hard copy and then back again.

Ug the Caveman didn't *need* a hammer. Any handy rock would do the job. But a hammer made the job easier.

As technology—literally "know-how"—increased, it became more complex. It also became woven into the fabric of the growing human culture. We really don't *need* fire, but we would find it extremely difficult to get along without it. The *need* has long ago been buried in our cultural consciousness.

I have a hypothesis that all new technology isn't needed.

However, some visionary people see and understand how the new technology can make living easier. Inventors usually do this. Unhappily, most inventors merely correct the deficiencies of an existing tool and expect the world to beat a path to their door. They do not realize that they *need* someone called a promoter or a marketing expert to perform an interesting function that is usually overlooked by such superficial people as television news reporters.

Every new technology must have someone who will convert a "need" into a "want."

Before the telephone was invented, no one knew they needed it. Now everyone wants one and we cannot envision life without it. The unrealized need was converted into a want. People were convinced to buy telephones. Alexander Graham Bell wasn't the first person to invent a telephone, but he was the first to develop a telephone *system* and then go out and sell it, converting a *need* into a *want.* We've always needed to communicate better and faster with one another, else we would never have developed language or writing. Bell knew this.

Thomas Alva Edison wasn't the first person to invent a workable light that didn't depend upon combustion. Edison also developed a *system* that made a *need* into a practical *want.*

The railroad was a different matter. It was developed to haul freight—specifically, coal. But when bystanders saw that the early railway trains provided an easy way to get from here to there, they automatically converted their *need* into a *want* and climbed atop the coal cars.

Our civilization is full of things that, before they were invented and marketed, no one *needed* and now no one can do without!

We got along reasonably well without them, but we got along better once we had them.

And now, having got them, we wouldn't go back for any reason!

(Those who tried going "back to nature" recently discovered how difficult and deadly it was without technology and an industrial infrastructure to support them in the process.)

Do we *need* all these new computer toys that show up at Comdex and elsewhere every year?

No.

But some of us *want* them. We *desire* them. We can do a better job with these tools. By doing a better job, we can beat the competition. When we begin to do that, other people begin to *want* them as well. Very quickly, no one can do without them. Competition is a wonderful thing; Darwin thought highly of it.

When it comes to the wonderful computer "toys" of all types, we may not *need* them, but marketing experts and salesmen make us *want* them.

The computer is no longer just a super-adding machine. It has become an information tool. It is a means to conserve brainpower, one of our most precious resources. It is not only changing the way we handle information, it is changing the way we communicate this information to other people.

We got along fine before we had on-line computer networks, didn't we?

So who needs the Internet?

Perhaps in asking who needs the new computer technology, the TV anchor was a bit prescient. It won't be very long before the information communications capabilities of this technology mean that we no longer need *him!*

(Readers can always reach the author via Internet at gharry@bix.com if an alternate view either enlightens or enrages them. A couple of years go, readers had to write letters that were then physically transported and delivered by hand. If the tools are available, it's easier now. Never neglect the biological Law of Least Effort.) ■

Mistakes are seldom serious unless repeated.

—Anonymous

Wise living consists perhaps less in acquiring good habits than in acquiring as few habits as possible.

—Eric Hoffer

The art of progress is to preserve order amid change and to preserve change amid order.

—Alfred North Whitehead

Michael A. Burstein

TELEABSENCE

How a technology is envisioned and how it's actually used may be quite different.

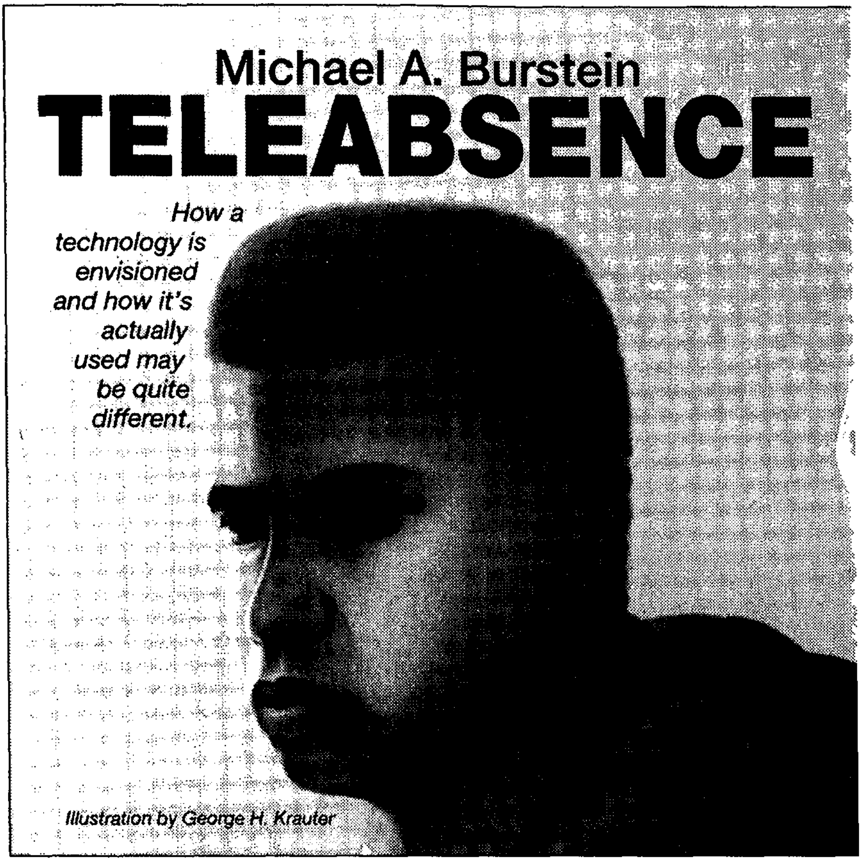
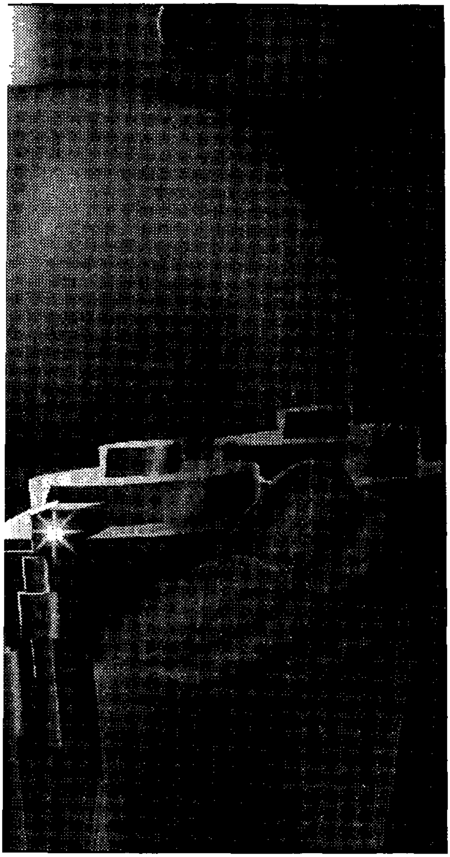


Illustration by George H. Krauter

Tony put on the spex and scrunched his hands into the tight datagloves. He pushed a button on the right earpiece, and the world around him changed.

He had been sitting in his little room, with torn clothes scattered about, a broken dresser, and a dirty window that looked out onto a brick wall. Now he found himself in a classroom. The floor was clean and the walls were a bright yellow. Tony counted fifteen desks arranged in a roomy and orderly fashion, fewer desks than he had ever seen in a classroom before.

Tony had jacked in at a few minutes before nine so he'd have a chance to explore before anyone else showed up, and he started with the windows. These windows weren't broken, like those at his own school, and it looked as if morning sunlight actually streamed in from a clear blue sky. He opened one and stuck his head out to see an incredibly large playground a few stories down; nothing like the old broken-down one in his neighbor-



hood, where Mom never let him go, even in the middle of the day. Not that Tony was about to do so, ever; he was just as scared of the gunfire as his Mom was.

Tony pulled his head back into the room and continued exploring. Walking around felt strange, since he could feel his legs not moving as he sat in his room. And yet, in this classroom he was standing, and moving his hands around caused the rest of his body to follow. He traced the edge of the room, sliding along the screenboard at the front with the alphabet printed above it, and along the walls on the side, which were decorated with the artwork of the school's students. There was a calendar, set to this month, September. He also noticed a seating chart, with each student's name in a different handwriting.

He came to a mirror in the back corner of the room, and stopped short. Staring back at him wasn't his deep brown face and curly black hair that was all too familiar, but an image of a white kid with blond hair, dressed in a button-down shirt and slacks. The spex and gloves didn't appear in the mirror either, just sparkling brown eyes and smooth pink hands. Tony moved his arms and face around, and the mirror image did so too. *No wonder the gloves are so small*, Tony thought, *this kid has got to be at least a year younger than me. Maybe this isn't a sixth grade class—*

A sharp buzz startled Tony and he jumped. At the front of the room appeared a pretty white woman who looked as old as Tony's teachers, but she wasn't scowling the way Tony's teachers always did. Instead, she was smiling. Despite that, Tony felt scared.

"Good morning, Andrew," she said. "I'm surprised to see you here early." Her voice was soothing to Tony's ears, and he calmed down. There was no way she would figure out that he wasn't Andrew; the mirror had shown him exactly as he appeared in this virtual classroom.

"Hello, Miss. . . ." Tony trailed off. He knew that he had taken Andrew's place, but he had no idea what the teacher's name was.

"Why *are* you here early? You're usually one of the last to jack in."

"Ummm . . . well. . . ." Tony looked around as he stalled, and spotted a nameplate on the desk. Fortunately, it was facing towards him.

"Miss Ellis, I just felt like taking a look around before we started." Tony's voice sounded like his own to his ears, which worried him. Would Miss Ellis be able to hear that he wasn't Andrew?

Apparently not. "OK, Andrew, though you won't have much time." She looked at her watch. "In just a minute—"

Another buzz, and this time a cute girl popped in, already seated at a desk. "Good morning, Miss Ellis."

"Good morning, Sheryl."

"Hi, Andrew!"

Tony wasn't sure how to respond, but it seemed safest to say little. "Hi, Sheryl."

Sheryl opened her mouth to speak, but was interrupted by another buzz. The ritual repeated itself over the next few minutes; another kid popped in each time, some already sitting, some at the door, and one or two in the corners, until there were fourteen other students. Most were white, although he saw two who were black and three who he thought were Chinese. Tony noticed how happy they all looked, as they milled about talking to each other. Tony wanted to mingle, but was afraid, and so he stayed off to the side, studying the seating chart. Andrew was assigned to the front row, second seat. At least he would know where to sit when class began.

He traced the name of the student he was replacing, Andrew Drummond. Now he had a full name to attach to the spex.

Another buzz, deeper and longer, startled Tony, and a chill went through him. What if that was Andrew jacking in? He would ruin everything, and everyone would know that Tony was a fake! Tony looked around, scared, but didn't see anyone that resembled the kid in the mirror.

"OK, class," said Miss Ellis, "it's nine o'clock. Time to begin." So that's what that different buzz meant. Tony relaxed into his—into Andrew's—seat. As long as he had Andrew's spex, he realized, he *was* Andrew, and there was no way that the real Andrew could pop in and prove otherwise. Tony wished he could be Andrew all the time, but at least he could be Andrew for the school day. Then he'd have to return to his own life. For the first time, he dreaded the final bell that would go off at three o'clock.

Miss Ellis began the class by taking attendance. Tony remembered to respond when he heard Andrew's name, which was second, right after Melissa Connor, who sat to his left. Once Miss Ellis noted that all were present, she told the class to take out their homework from last night.

At first, Tony didn't know what to do. He felt a lump in his throat as he realized that he couldn't take out last night's homework since he wasn't really Andrew. He knew the punishment he could suffer for not having his homework with him, and he started to tremble.

Then he noticed what Melissa was doing. She pushed some button on her desk and her computer screen flashed, and now she was waiting patiently. *Maybe the homework is also done in virtual space*, Tony thought, and he looked at the buttons on his desk. Sure enough, among all the letters and numbers of the keyboard there was a button labeled "HOMEWORK." Tony pushed it with relief.

His screen blinked, and a message came up: "Please enter your homework password."

Oh, no! I don't know Andrew's password! Tony thought. Now what? Maybe Miss Ellis wouldn't notice if he just sat there looking intently at the screen. If he kept his head down, perhaps she wouldn't call on him. Then he wouldn't be found out.

"Melissa? Please tell us how you did the first problem."

The first problem was an easy math problem, but Melissa got it wrong. Tony braced himself for the explosion, but it didn't come.

"That's OK," said Miss Ellis instead. She worked out the problem on the screenboard in front and showed Melissa where her mistake had been. Tony was shocked. She hadn't yelled at Melissa for being wrong, and Melissa hadn't made any rude comments or started crying.

"Andrew? Would you please explain the next problem?"

Bad luck. It looked as if Miss Ellis went through the class alphabetically when going over homework, and naturally that meant Andrew was next. But Tony knew he couldn't go over the next problem. What could he do?

"Andrew? Is there a problem?"

Tony looked up. Miss Ellis wasn't frowning, and she didn't seem upset at all. She hadn't yelled at Melissa for being wrong; maybe Tony could pretend to be having a problem as Andrew and not get yelled at.

"Yes, Miss Ellis. Ummm . . . I forgot my password."

"Oh, is that all? You should have said something." Miss Ellis came over to his desk, pushed a few keys, and accessed the assignment for him. It made sense, he realized, that she would be able to do that.

The homework that Andrew had done came up on the screen. Feeling relieved, Tony puzzled out the solution to the second problem, which fortunately Andrew had done correctly. Tony treasured the "Very good" that Miss Ellis said in his direction, even if it was followed by "Andrew."

The class continued throughout the morning, with Miss Ellis going from subject to subject. A little math, some English, a bit of art. Tony especially enjoyed the art, as being in a virtual classroom enabled him to create beautiful pictures almost by just thinking of them. He could paint pictures in three dimensions, and he even created a collage using video images that moved and sound effects that came from a classroom library of such things. It almost got him discovered, because apparently Andrew was not too keen on this subject, and Miss Ellis became suspicious of "Andrew's" new-found enthusiasm for light sculpting. But it turned out all right; Miss Ellis was actually more pleased than suspicious to see Andrew taking an interest.

A little after eleven o'clock the buzz sounded, announcing the lunch period. Miss Ellis and the students jacked out one by one. Tony envied the other students; he imagined them in comfortable homes, sitting at tables with steaming hot plates piled up with food.

Tony himself didn't jack out. He spent the entire forty minutes in the virtual classroom, relishing every minute he was there. He played with his desk computer, using it to create more works of art and to read history textbooks that changed the words they used when Tony punched in that he didn't understand something. He didn't mind the stomach rumbles he felt near the end of the period; he was used to them.

"Now, class, we're going to learn a little geography. Who can tell me what this is?" Miss Ellis pushed a button at the top of the blackboard, and a holographic map appeared, floating halfway between her desk and the class. Tony recognized it and raised his hand. So did most of the class.

Ms. Ellis called on Tony. "Yes, Andrew?"

"It's the United States." Tony thought it was the most beautiful map he had ever seen. It shimmered in the air, floating in and out of insubstantiality. The features—states, cities, mountains, and rivers, just to name a few—were displayed in many different intense colors. There was a vibrancy to this map which made it more real than any flat map Tony had seen in his own classroom.

"Very good, Andrew. Well, class, today I want to introduce you to the various parts of our country, and I think the best way of doing that is to have you do it for us. Who wants to be first to tell us where they're from?"

The girl sitting to Tony's right raised her hand. "Janice?"

"I live in Florida, Miss Ellis, in Neptune Beach, near Jacksonville. But I just moved there from San Francisco."

"Can you point out both places on the map?"

Janice punched a few keys on her desk computer, and a small spot in northeastern Florida lit up in green. A second later, so did a spot in northern California.

"Very good! Someone else?"

One of the Asian girls raised her hand. "Sandra?"

Sandra hit a few keys and a spot near Washington, D.C. turned green. "I live in Silver Spring, Maryland."

Miss Ellis continued going through the class, and the students became very enthusiastic about it. "I'm in East Lansing, Michigan!" shouted a kid named Brian, who had just moved from Los Alamos, New Mexico. "I live near Boston!" shouted another. Each student's hometown was lit up, either by Miss Ellis or by the student.

Tony felt scared. He lived in Harlem, in New York City, and desperately wanted to volunteer that information, but he couldn't. He was supposed to be Andrew, and he didn't know exactly where Andrew lived.

He knew it was out on Long Island, because the car with the spex had displayed Long Island license plates. But where on Long Island?

And how did the other students use the computer to light up the map?

The next one to go was Sheryl, who had been the first student to pop in after Tony. She used her computer to light up Suffolk County, on Long Island. "I live in Port Jefferson," she said, "right near Andrew."

"Andrew, would you like to locate your hometown as well?" asked Miss Ellis. "You could come up to the map since it's already lit up."

Feeling trapped, Tony ran up to the map, stabbed at Suffolk County with his—Andrew's—finger, and sprinted back to his seat.

Miss Ellis went through the rest of the class. All over the map, the hometowns were lit up in green. "Who would like to talk about their hometown first?"

Tony felt Miss Ellis's eyes staring right at him, and worried that she might call on him. Her eyes passed over him, though, and she called on Brian. Tony exhaled a breath that he didn't realize he had been holding.

Since he knew Los Alamos better than East Lansing, Brian chose to talk about his original hometown instead of where he was now. Tony barely paid attention as Brian talked about the joys of small town life and then displayed some pictures from a family photo album that he was able to pull up using his computer. Miss Ellis then discussed the arid mountainous area where the town was located, and how there had been a scientific laboratory there until the year 2010.

Janice went next, and again Tony was too scared to pay attention. Janice described San Francisco, and, possibly still thinking about lunch, mentioned the delicious seafood and sourdough bread. Miss Ellis talked about other things, such as the earthquakes that San Francisco had experienced, and the Golden Gate Bridge, which she said had been one of the longest suspension bridges in the country until the earthquake just last year that destroyed it. She showed three dimensional video images of the earthquake, and even made the classroom shake up a bit, so the students could experience a bit of what an earthquake was like.

Janice continued, "But now I live in Florida, and it's really nice, except it gets awful hot in the summer. But let me show you!" With that, Janice hit a few keys, and on the screenboard appeared a picture of a large white house. "See! There's my front yard!"

"Oh, yeah?" said Brian. Using his computer, he erased the picture of Janice's house. A few seconds later, a picture of Brian appeared, wearing spex and sitting in some sort of large black chair with arms that closed in front. Tony felt uneasy, looking at that picture.

Brian waved his hand in class, and so did the Brian in the picture. "See!" he said. "That's me in real time!"

"Oh yeah?" said Janice. "Well, watch—"

"Janice! Brian!" Miss Ellis interrupted. *Oh no*, thought Tony, *now they're going to get it*. He braced himself for the shouting. Instead, the two students each mumbled an apology.

"It's OK," Miss Ellis said. "I understand why you're excited, I just didn't want you to get out of hand. You see, class, one of the nice things about being here is that we all jack in from different places. Each of you can learn from one another about the great diversity we have in this country. Here you are, telling each other about your hometowns, even though you may live thousands of miles away from your classmates. I figure it will also give you a chance to find out more about each other, since it is so early in the school year."

Sheryl raised her hand, which worried Tony. "Couldn't people do that before?"

"Well, yes," Miss Ellis replied, "but it wasn't so immediate. In fact, you're experiencing something now that in the past only college students could usually experience. And they had to travel physically to one common location to share their backgrounds, which was much more expensive and time consuming. You don't need to do that at all."

Miss Ellis turned to Tony. "Andrew, since Sheryl asked a question, why don't you tell us about your common hometown of Port Jefferson?"

Tony looked down at his desk. His stomach felt queasy. If only Sheryl hadn't brought attention to herself, and then to him as well. Or if only Sheryl hadn't been here in the first place. Then he could make up anything he wanted about Port Jefferson, and Miss Ellis would never know. But Sheryl would see right through any lies he might tell, and anyway, Tony didn't like to lie.

But wasn't that what he was doing right now, pretending to be Andrew?

"Andrew? Are you OK?"

"Yes, Miss Ellis. I—"

Tony was interrupted by a sharp buzz, and he looked up. At the front of the classroom appeared an older man with thick grey hair. He headed straight for Tony, a scowl on his face, and Tony looked down again, in fear.

He heard Miss Ellis speak. "Mr. Drummond, what are you doing here?"

The man didn't answer Miss Ellis. He went right up to Tony and said, "Give them back! They're mine!"

Tony shivered. It had been too good to last; now he was going to be found out. This man was obviously Andrew's father, come to get the spex back.

"Mr. Drummond!" said Miss Ellis, with an angry tone that was familiar to Tony. "I would appreciate it if you would not interrupt my class to talk with your son! Can't this wait until later?"

"This is not me—I mean, this is not my son!" Mr. Drummond shouted.

There was silence for a moment. Tony felt Miss Ellis move next to him and Mr. Drummond. "What's going on?" she asked.

"This kid stole my—I mean, my son's spex!"

Tony looked up at Miss Ellis, and saw her smile. Facing Mr. Drummond, she said, "That's you, isn't it, Andrew?"

For the first time since he appeared, "Mr. Drummond" looked uncomfortable. "Ummm, yeah, Miss Ellis. I had to use Dad's spex to jack in. Whoever this is—" he pointed at Tony—"stole my own spex."

"Ah-ha. Andrew, go home. I'll take care of this."

"Ummm. You won't tell my Dad, will you? I don't want him to know that I've been careless."

"No, I won't tell him. Now go. I'll contact you later."

The image of Andrew's father vanished, and Miss Ellis turned to Tony. He was on the verge of tears.

"Well, young man, who are you?"

He sniffled, and whispered, "My name's Tony."

"Tony? Did you steal Andrew's spex?"

"Yes." He could barely hear himself.

Miss Ellis sighed. "Why?"

Tony looked up into Miss Ellis's eyes, and it all started pouring out of him. "I just wanted to go to a good school, one where I wouldn't be afraid, where the teachers and kids are nice, where I don't have to worry about guns or drugs or being beaten up or—" Tony stopped. He felt as if everyone was staring at him. They probably were, but it was too late to take back anything he had said.

"I found the spex in Manhattan, Miss Ellis. I know it was wrong, but I didn't care. I just wanted to go to school somewhere *nice*. I'm sorry." He started to sob.

"Class, I'll be back in a moment. No one jack out."

Miss Ellis tapped at the air to the side of her face, and the classroom around Tony vanished.

* * *

Tony found himself alone with Miss Ellis in a much smaller room furnished with a desk, chair, and sofa. He had been sitting at a desk; now he was standing. He was still crying, though. He wasn't worried that Miss Ellis would beat him, since she really couldn't hurt him through the spex. She might yell at him instead, but when she spoke her voice was calm.

"Tony, I've brought us here so we could talk alone for a few minutes, away from the rest of the class. I hope you don't mind, but I didn't think you'd want to continue talking about this in front of everyone."

Tony nodded, and wiped away the tears on his face using his sleeve. He didn't want to get the datagloves wet. "Thanks."

Miss Ellis sat on the chair, and motioned Tony to the sofa. As he sat down, he spotted his image in a mirror he hadn't seen before. He still looked like Andrew.

"Tony, why don't we start with you telling me about yourself, like where you live and what your full name is."

"I'm not going to get into trouble, am I?" he asked.

Miss Ellis smiled. "No, you're not, Tony. I want to help you."

Tony told Miss Ellis about his life; in particular, about the horrors of his awful school. He was surprised to discover that Miss Ellis also lived in Manhattan, but downtown, below the fence. When Miss Ellis found out that Tony was black, she made some adjustments and asked Tony to check his appearance in the mirror. Tony was surprised to see a black kid facing back. It still didn't look like him, so he told her more about his real appearance. He watched as Miss Ellis changed the image again, until it more closely resembled his true appearance.

When Tony was satisfied, Miss Ellis gave him a long hard look. "Tony, I'm not going to tell you how wrong you were to steal the spex, because I can see how bad you already feel." She paused. "And, frankly, I agree with what you did."

Tony was surprised. The teacher thought it was OK that he stole something?

"I guess it's because I remember when those spex you're wearing were first developed. They were praised as being the first step to solving the problem of violence in schools—if the students weren't physically in one real place, they wouldn't be able to hurt each other."

"Do you mean that I was supposed to have the spex in the first place? Is that why you approve?"

"Well, I don't really approve of the stealing. But I understand. After all, Tony, you and kids like you were the main reason they were invented in the first place. But I guess people forgot that it's not enough to develop the proper technology. You've got to fund it too."

Miss Ellis stood up and walked across the room, her back to Tony. She took a deep breath, and then turned around to face him.

"Tony? Would you like to stay in telepresence school? Not have to go back to your old school ever again?"

Tony's eyes opened wide and he let out a breath he hadn't realized he had been holding. "You mean I can stay?" He tried to keep the eagerness out of his voice.

"Well, not as Andrew. This is going to be difficult to arrange. Technically, you can't come to telepresence school unless you can afford it, and obviously you can't. But we might be able to sneak you in."

Tony couldn't believe what he had just heard. "Sneak me in? Isn't that as bad as my taking a pair of spex?"

"Yes and no. I might be able to work it out so that you have your own set of spex, and can attend my class on a regular basis. We'd have to get you a full simulator too, if you want to participate in outdoor games. But you won't be able to attend as yourself."

"You just said I can't be Andrew. I don't understand."

Miss Ellis sighed. "Tony, I believe you have a right to be here, as much right as any other student. But I personally can't afford to pay for you. And I suspect that your parents can't either."

"My Mom. We don't know where Dad is."

"Your mother, then. The problem, Tony, is that the computer that runs telepresence school keeps track of every student through the spex, and so it knows how to charge you. Your little visit today cost Andrew's family some money."

This made Tony feel worse. "Then maybe I shouldn't be here at all."

"No, Tony, you can be here. I have a—a friend who can do something to a pair of spex so you won't be charged, but the cost of attending will be spread out onto all the other students. That way, no one student will be charged too much for you, and you'll be able to attend the school."

"Isn't that stealing?"

Miss Ellis thought a moment. "Technically, yes, but the theft is so small and spread out that no one would notice. Besides, it's the only way I can arrange it.

"So, Tony, would you like to attend telepresence school?"

"Yes, Miss Ellis, very much," he whispered. After all, he told himself, it couldn't be completely wrong if the teacher was willing to do it.

"OK, but we can't let you enroll as Tony, because the other students know who you are."

"Does that mean I have to be white?"

"No, Tony, of course not. No one else has seen your real appearance but me, so you can look like yourself if you wish. That's no problem. But we'll have to call you by a different name, and probably pretend that you live somewhere other than Manhattan. Will that be OK?"

"Fine. Ummm . . . Miss Ellis?"

"Yes?"

"Why are you doing this?"

Miss Ellis frowned, and for a moment Tony worried that he had just said the wrong thing. But then she smiled. "Never mind, Tony, it isn't something you need to worry about. In the meantime, you'd better give me your phone number and go home. Tell your mother I'll call her tonight."

"Excellent work, Howard."

"Thank you, Miss Ellis," Tony said. For three months now he had been enrolled at the telepresence school, in the same class that he had visited using Andrew's spex. Tony now had spex of his own, along with a full simulator, and had begun to strike up a few friendships with the other students, including, oddly enough, Andrew.

Of course, they didn't think of him as Tony. He was "Howard," from a middle-class family living in Forest Hills on Long Island. Forest Hills had once been a part of the city, but was now a neighborhood in one of the three independent boroughs, a place where it was reasonable to assume that a family had the money to send a child to telepresence school.

At first, Tony felt strange pretending to be from someplace where he was not. But Miss Ellis had brought him through a virtual representation of the neighborhood before bringing him into the school, and fortunately, none of the other students had tried to trip him up with questions about his hometown.

Which was good, because Tony was happy here. He couldn't remember ever having been happier.

"Howard? Are you with us?"

"Oh, sorry, Miss Ellis, I was just thinking." Tony felt his cheeks flush as the rest of the students turned around to stare at him in his back row seat. Fortunately, no one could see his embarrassment in the virtual classroom.

"As I was saying, it's time for playground recess, so everyone get ready." With that, Miss Ellis tapped at the air next to her ear, and the class was virtually transported to the playground "outside." They did this every day of school, but it never ceased to amaze Tony. He always felt a warm sun and cool breeze playing against his face, which seemed perfectly real, even though he knew it had to be an illusion.

He closed his eyes and took in a deep breath; the stale air reminded him that he was really in the simulator back in his apartment. As he was about to breathe out, he felt someone tap him on the hand.

"You're it!" He opened his eyes; it was Andrew who had tagged him, and who was now running as fast as he could go. Tony usually played with Andrew and Janice anyway, so he smiled and raced toward Andrew as fast as he could go, on virtual legs.

They played tag and ran around for most of the recess period, and near the end, the three friends sat down on a bench to rest up. It would soon be time to return to the classroom. Janice took a minute to catch her breath, then jacked out to get a glass of water, leaving Tony and Andrew alone.

"Boy, that was fun!" Andrew said.

"Yeah, it sure was."

"Listen, Howard, I've been thinking. You live in Forest Hills, right?"

"Ummm . . . yeah, I do."

"Well, that's practically next door to me! Why can't we get together in the real world?"

Uh-oh. Tony had been afraid that Andrew would suggest something like this. "Wouldn't it be too difficult? I mean, you don't *really* live next door."

"So?"

"So it would be a problem for me to come out to Port Jefferson."

"Hey, is that all? My Dad can drive me to your house, then, no problem. He usually has business to do in Manhattan anyway, and sometimes lets me come along with him. I think I can get him to drop me off at your place for a day."

That was the last thing Tony wanted to hear. "I don't know," he replied, speaking slowly. "I don't think my Mom wants me to have friends over."

"Can't we just go hang out in Forest Park or something? We wouldn't have to spend the day at your house. My Dad could just drop me off there."

"Well. . . ."

"Besides, we can invite someone else along too."

"Who?" Who lived close enough to join them?

"Sheryl." Andrew smiled. "I've seen the way you look at her. You like her, don't you?"

"No," Tony lied. He felt pained.

"I know! Let me go ask her now! We can try to get together this weekend!" Andrew jumped up and started shouting Sheryl's name.

"No! Andrew, please don't!" Tony started to cry.

Andrew sat back down. "Howard, what's wrong? I'm just suggesting a little friendly get-together."

"We can't get together at my house. We *can't*."

"Why not?"

Tony thought hard. He liked Andrew, and he knew that Andrew liked him. They hung out together almost every recess, and usually worked together when Miss Ellis made everyone find partners for school projects. Surely Tony could trust him, couldn't he?

Besides, he still felt very bad about lying. No matter how much he wanted to be here, no matter how much Miss Ellis said he had a right to be here, it still bothered him. Perhaps if someone else knew, someone like Andrew, it would make him feel better. After all, Andrew liked him. Surely Andrew would keep the secret.

And, come to think of it, there was no way Andrew would tell anyone. If he did, his father would find out about the time Andrew was careless about his spex.

"Howard? Why not?"

A deep breath, then: "Because my name's not Howard. It's Tony."

Two days later, on Friday afternoon, Miss Ellis asked Tony to stay after school so they could have a private talk. After all the other students jacked out, she asked, "Tony? I notice that you and Andrew don't seem to be getting along as well as you used to. Is there a reason for this?"

Tony squirmed in his seat. Miss Ellis wasn't smiling. "Uh, no, Miss Ellis."

"Are you sure?"

He remained silent for what seemed like a minute.

"Tony, did you tell Andrew about our little arrangement?"

He didn't say a word. He couldn't; his throat was choked with fear.

"Tony? Did you tell Andrew?"

He croaked out a whisper. "Yes, Miss Ellis. I *had* to."

She sighed. "Tony, I was afraid of this. You shouldn't have told him."

"But Miss Ellis, he wanted to come over and visit me. I couldn't let him. I had to tell him why; I wasn't about to lie to him."

She smiled bitterly. "No, I guess not. Tony, I applaud your honesty, but this afternoon you and I are going to have to face Mr. Drummond."

"Mr. Drummond? Do you mean Andrew actually told his father?"

"Yes, and it gets worse. Mr. Drummond is a lawyer, and he's on the board of trustees of the telepresence school program. Do you know what that means?"

"No, I don't."

"It means that he's one of the people who makes policies for the school. He makes decisions on how money is spent to keep the school operating. And I don't think he wants to see us because he agrees with how we're spending the school's money."

"I'm sorry, Miss Ellis. I didn't mean to get you into trouble."

"It's all right, Tony. In a way, your honesty makes me proud. But—" she pushed a button and a clock appeared on the screen—"we have only half an hour until Mr. Drummond jacks in to talk with us. I suggest you jack out for that time and talk to your mother; let her know what's going on. Then come back."

"Can Mom come too?"

Miss Ellis looked at Tony sadly. "I'm afraid not, Tony. You only have one set of spex at home, and Mr. Drummond wants to see you, not your mother. But don't worry. I'll be here too."

* * *

Tony had a hard time telling his mother about what had happened. He was worried that she would be very angry at him for ruining his chances of attending a good school. Fortunately, her attitude had been similar to his teacher's.

"We'll figure something out, Tony, we always have," she said while hugging him tightly. "You just go back and talk to Mr. Drummond. Maybe you can make him change his mind about you. Show him what a good boy you are."

Tony jacked in, for what he thought might be the last time, and was back in the classroom with Miss Ellis. She was talking to Mr. Drummond.

At the sound of the buzz signaling Tony's arrival, the two adults turned to face him.

"So here's the young man," said Mr. Drummond gruffly. Tony took a good, long look at Mr. Drummond, and tried not to seem afraid. Mr. Drummond towered over Tony impressively. His hair was thick and grey, and he wore an elaborate suit with a vest and chain. Tony also noticed that Mr. Drummond was sporting a pair of metal frame glasses, which didn't make sense to him. In real life, after all, Mr. Drummond had to be wearing a pair of spex, so having his image wear glasses had to be a personal choice.

Tony almost laughed at that—*how silly of Andrew's father to have his image wear glasses!*—but he bit off the laugh quickly. *Mr. Drummond's glasses probably mean as much to him as my skin color means to me.*

Tony greeted him solemnly. Mr. Drummond returned the greeting with an embarrassed smile and turned back to Miss Ellis.

"As much as you may like the boy, it's unfair to the rest of us to keep him enrolled at this school. Your little billing stunt is grounds for dismissal, you know."

"Yes, I know. But, Mr. Drummond, if you knew what Tony had to face each day in a regular school—"

"That is not the issue here. I understand what Tony has to deal with at his local school. But look at what his presence does to our own resources." He tapped at the air and a sheet of figures appeared on the screenboard.

"The fact that you tried to spread the expense out to everyone is commendable, Miss Ellis, but it's still patently unfair to those families who are just barely able to send their children to telepresence school. If you look at these records, you can clearly see that some families are about to receive bills that may only be slightly higher than expected—but still higher. Did you honestly expect that no one would take notice?"

Miss Ellis turned to look at Tony. "I hoped," she said.

"Well, I'm afraid it's not possible. The money simply doesn't exist. The school cannot afford to keep him here."

"He's one of the best students in the school. Is there nothing we can do for him?"

Mr. Drummond sighed. "What about all the other Tonys out there? We'd be unfair to all of *them* if we favored just one particular student.

This is a private institution, not a public one. It's completely supported by the families, and quite a few of us are stretched to the limit. I'm sorry."

"I knew you had to be rich to attend," Tony heard himself say.

Mr. Drummond frowned at Tony. "Tony, to you we may seem rich, but believe me, we're just getting by. Perhaps we don't find it as difficult to live as you do, but we honestly can't afford to keep you here."

He turned back to Miss Ellis. "We'll have to make arrangements to retrieve the simulator and the spex. I have to go now; I have a trustees meeting to attend." He tapped his earpiece and disappeared, leaving Tony and Miss Ellis alone in the classroom.

"I guess I won't be able to stay, then." Tony said. "But I don't want to go back to my old school." He started to cry.

"Tony, don't cry. Listen to me. There is a way out."

The following Monday afternoon, Tony took the subway down to Greenwich Village. He had to show a pass at 96th Street in order to continue under the fence, but Miss Ellis had arranged everything.

He went to the address Miss Ellis had given him, a brownstone on West 10th Street, and rang the doorbell. A black woman opened the door. She had a thick red scar seared across her right cheek.

Tony stammered. "I'm sorry, I'm looking for Miss Ellis. I must have the wrong place." He started to back down the steps.

"It's OK, Tony, this is my house."

Tony stared at her, afraid to enter. The voice was right, but. . . .

She laughed. "It's me, Tony. Come on in."

Tony hesitated, then followed her into the house. "I'm sorry, Miss Ellis, it's just that—"

"I understand. I've set up a classroom in back."

They entered a small room with a tiny green blackboard in one corner and two small desks. Written on the board with actual chalk were the words "Welcome Tony." Sitting on the desks were notebooks and textbooks. They looked old and worn, but also loved.

Tony looked at Miss Ellis and smiled. She smiled back. Even with the scar, she was the most beautiful sight in the world. "Well, let's get started," she said. "I told you things would be different." ■

So much has already been written about everything that you can't find out anything about it.

—James Thurber

Part Three of Four

Ben Bova

ORION AMONG THE STARS

There's an assumption humans often make about very advanced species that isn't necessarily true. But does that mean that nothing can be done about it?

Illustration by George H. Krauter

Synopsis

I am Orion.

I was created by Aten, the Golden One, and sent through time to do his bidding. I have fought at Troy and Jericho, I have done battle when dinosaurs ruled the Earth. I have died many times, to be revived by Aten and sent on other missions in spacetime.

Aten claims he created the human race; that he sent me and others of my kind back in time to destroy the Neanderthals and prepare the Earth for Homo sapiens, *his creatures. If he speaks the truth, then we are his ancestors. His, and the other Creators as well.*

There are many Creators. Often in ancient times they allowed themselves to be worshipped as gods and goddesses. I loathe Aten and the other Creators, even though I am bound to do as they command.

But there is one Creator whom I love: the beautiful Anya, who has helped me and protected me over the eons and light-years of spacetime. And she loves me; a goddess and a creature, in love.

Now I find myself in the midst of a vast interstellar war, in which humans are allied with a reptilian race called the Tsihn. I am captain of a combat team that has been sent on an impossible mission.

The soldiers are literally born to the army. Both men and women, they are clones who have been raised strictly for military duty. They have never known any other life but warfare. Between battles they are frozen cryonically; it's cheaper than feeding them.

My combat team has been sent to the jungle planet Lunga, which is held by troops of the Skorpis, a race of giant catlike warriors. The mission has been a disaster from its outset. Hugely outnumbered, my team was nearly wiped out by Skorpis attacks and abandoned by the Tsihn battle fleet in orbit about the planet.

I led the survivors halfway across the planet to the main Skorpis base, on the shore of a tropical sea, intending somehow to attack the enemy. Lt. Frede, the woman who is my second-in-command and bunkmate, is having treasonous thoughts of abandoning the fight and living off the land, forgetting about the war and merely trying to survive in the jungles of Lunga.

My orders are to fight the enemy. I am Orion, the hunter, the warrior. I will fight to the death.

But first I must scout out the Skorpis base. I decided to approach the base from the sea. Alone.

As I swam toward the Skorpis base I discovered why Aten sent me to the planet Lunga. Its seas are inhabited by the Old Ones, an ancient race of ocean-dwellers, far older and wiser than we humans and the youthful races that we war with. Aten wants me to make contact with the Old Ones and get them to help us win this interstellar war.

And the war is against other humans! Although there are other races involved, such as the Tsihn and the Skorpis, this vast, devastating, generations-long war is actually a struggle between the Common-

wealth and the Hegemony, both human civilizations.

In reality, it is a war among the Creators themselves. Just as they did at ancient Troy, the Creators are manipulating the humans and the other races in a deadly power struggle among themselves. Their war has already killed billions and destroyed entire planets.

Aten and his faction are battling against a bloc of Creators led by Anya, the goddess whom I love, the Creator who has taken on human form in one lifetime after another to help me, the woman who loves me.

But I am Aten's creature, bound to obey him. And now Anya is my enemy.

The survivors of my combat team have been taken prisoner by the Skorpis and frozen. The Skorpis eat their captives. I have managed to capture a team of human scientists who were working with the Skorpis to try to make contact with the Old Ones and gain their help.

Now I must trade the scientists back to the Skorpis in return for my own troopers. If it's not too late to save them.

PART III.

CHAPTER 17

"Who are you, really?" Delos asked me.

We are alone in the cramped galley of the survey vessel, no more than an hour away from taking up orbit around Lunga. The commander of the cruiser squadron escorting us had suggested putting a Skorpis crew on board our vessel. I had refused, assuring her that we were returning peacefully to Lunga and did not need her help.

"I am Orion," I answered as I poured myself a cup of a stimulant processed out of alkali crystals from the gleaming vat built into the bulkhead.

Delos shook his head and smiled at me. "Look, I could say that I am Delos. But that tells you nothing except what to call me."

His eyes were inquisitive, not demanding. The smile on his bearded face was gentle.

"I see," I replied. "You are Dr. Delos of the University of Farcall, chief of the scientific research team on the planet Lunga."

His poured himself a mug of the steaming brew as he said, "I am also the son of Professor Leoh of Albion and the Lady Jessica, director of the Farcall Institute of Exopsychology, science laureate of the Golden Circle, and husband of Randa."

That last piece of information surprised me. "You and Randa are married?"

"Didn't you know?"

From the way they seemed to take the opposite position on every question, it had not occurred to me that they might be husband and wife. I was almost amused by the thought.

"Now that I've told you who and what I am," Delos returned to his original question, "just who and what are you?"

I had to shrug. "I am Orion. A soldier."

"There's more to it than that."

If I told him that I was created by a half-demented egomaniac from the far future, built to be sent on missions of murder and carnage through all the eras of spacetime, he would undoubtedly think I was either insane or joking with him.

So I said, "No, there's not much more to it than that."

"Your parents?"

"I'm a soldier," I repeated. "Do the soldiers of your Farcall have parents? Aren't they cloned and raised on military preserves? Aren't they kept apart from the rest of your society, frozen when they're not needed, revived and given their orders and sent out to do battle for you?"

He scratched at his beard. "Well, yes, I suppose so. I really don't know that much about the military. This field trip with the Skorpis is the closest to the war that any of us have come. Believe me," he added fervently, "it's been close enough for a lifetime!"

"You've been at war all your life, and for a couple of generations before you were born."

"Yes, but that's the military's business. We're scientists, we don't get involved in fighting."

"Yet you expect your military to protect you."

"Of course. That's what they're for."

I felt an unhappy sigh filling my chest. "Well then, think of me as one of those soldiers."

He studied me a moment with those inquisitive soft brown eyes, then said, "No, Orion, that won't wash. There's more to you than that. I want to know what you're hiding and why."

"What makes you think I'm hiding anything?"

"Because the Old Ones spoke to you," he hissed, and his eyes suddenly blazed, revealing his true feelings. "My team and I have been on Lunga for two months with no contact whatsoever, no matter how we tried to communicate with them. You come along and the Old Ones speak to you within hours of your reaching the ocean."

I had to smile. He was jealous. "I could be lying," I said.

"No, you're not lying. And you're not a simple soldier, either. Who are you, Orion? Why were you sent to Lunga?"

"I wish I knew," I told him. I drained my mug, feeling the hot liquid burn its way down inside me, then turned and left the galley, leaving Delos standing there seething with curiosity and resentment.

Randa was still in the cockpit with one of the other scientists. I told them both to get out.

"I'll take over the controls," I said.

She shot me a skeptical glance. "Are you sure you can handle it? Inserting a ship into planetary orbit isn't as easy as you may think, Orion."

Her meaning was clear. Even the slightly tolerant smile on her lips betrayed her thoughts. I'm a scientist, she was saying, and I can understand how to pilot a survey vessel by studying its control panel and calling for instructions from the ship's computer. You're a soldier, you can't be expected to know anything or to do anything you haven't been specifically trained for.

I reached down and grasped her arm. Lifting her gently from the pilot's seat, I said, "I can pilot a dreadnought if I have to. Go on back to the galley and ask your husband if he thinks I'm capable of running this little tub."

She looked surprised, annoyed. But she came out of the chair without resistance and started back toward the galley, casting a resentful look at me over her shoulder.

"You too," I told the scientist in the other seat. "I'll handle this by myself."

He huffed a little, but he left me alone in the cockpit. Scanning the control board, I saw that the vessel had an automated orbital-insertion program built into its computer's memory. Sensors were already estimating Lunga's mass and distance. All I had to do was touch a pressure pad on the board and the ship did the rest by itself.

I activated the communicator, instead, and asked for the Skorpis base commander. Several underlings tried to talk to me, but I refused to speak to anyone until the base commander's grim, gray-furred face appeared on the display screen before me.

"You are surrendering, Orion?" She made it sound more like a statement than a question.

"No," I said. "I have returned to offer you an exchange."

"What have you to offer that I would desire?"

"Your team of scientists."

Her lips pulled back slightly to show her teeth. "You captured them and now you return them?"

"I saved them from the Tsihn and now I offer them back to you."

Unconsciously she began grooming the fur of her face. "They must be of very little value to you if you offer them back to me."

I almost smiled, remembering the wonderfully fierce bargaining that would go in the bazaars of cities the Mongols had taken or even in the boardrooms of interplanetary corporations.

"Their value to me is not so important as their value to you," I said.

"What value are they to me? They cannot fight. They cannot entertain. They cannot be used for food. They have not succeeded in their mission. Because of them I have lost nearly two whole battalions of warriors."

I jumped on that point. "Your orders were to protect these scientists. You fought honorably and well to protect them. Unfortunately, you must tell your superiors that you failed. The scientists were captured, despite your spending nearly two whole battalions to protect them. It is very sad."

If a cat could smile, she did it then. "I have not lost the scientists. They are on your ship."

"But not on yours."

"Meaning?"

"Meaning that I will blow up this ship, with the scientists in it, if you do not agree to my terms."

"You will kill yourself, then?"

"Yes, and no Skorpis will ever eat my flesh. I will blast this ship and all of us into an ionized gas cloud."

Her massive shoulders moved in a very human-looking shrug.

"Go ahead, then. It is no fur off

my face."

"But what will your superiors say when you report to them that you failed to protect the scientists? What will they say when you report that you refused to take them back after they had been captured and returned? You will be meat for their larders, I'm afraid."

That brought out a snarl. "We can take your ship—"

"Not before I blow it to atoms."

She just stared at me. Even though it was only an image on the display screen I could feel the fury of that yellow-eyed stare. At that moment she would like nothing better than to sink her fangs into my throat.

"But I will happily return the scientists to you," I said, trying to sound carefree and cheerful.

"Under what terms?"

"That you return my troopers to me."

"They are prisoners. They surrendered with hardly a fight."

"So they are worth very little," I taunted. "How much courage can you ingest from soldiers such as they?"

"Then why do *you* want them?"

I had to think fast. "I want to revive them and train them to be true soldiers, worthy of their calling. So that the next time you meet them they will offer you a better meal than their miserable carcasses offer now."

Now it was her turn to do some thinking. She undoubtedly thought that I was lying, that there was something else going on. But actually, what I told her was as close to the truth as I could say. My troopers needed better training—and better leadership—if they were to survive their battles.

"I must consider this carefully," said the base commander. "The prisoners have been frozen. They belong to the larders of those who captured them. I must determine what payment those warriors should receive if they give up their food."

Nodding, I replied, "I'm inserting this vessel into a stationary orbit around the planet. In one hour I will set off the engines and blow up the ship."

"I will give you my response in less than one hour, Orion."

"Good." I cut the connection, and saw that my finger trembled slightly.

"You can't be serious."

Turning in the pilot's chair I saw that Randa was standing behind me. She had not gone back to the galley. She had heard my conversation with the base commander.

"I'm completely serious," I told her.

"You'd kill us all for the sake of a handful of soldiers? Soldiers? Why, they're little better than machines."

"They're quite human," I said, holding on to my temper.

"And you think that we'll just sit here quietly and allow you to murder us?"

There were no weapons among them, I knew. Even the tools that the ship carried were in cargo containers outside this crew habitat module.

I grinned up at her. "There are twenty-four of you and only one of me. But I doubt that more than three or four of you could squeeze into this cockpit area at one time. And I can handle three or four of you without raising much of a sweat."

"You're insane!" Randa snapped. "We're *scientists,* you big oaf! Each one of us is worth a hundred of your miserable soldiers."

I let that pass. I merely said, "If you keep your cool and don't do anything foolish, you'll be back at the Skorpis base within an hour or so. Or what's left of the base, anyway. If you try to stop me I'll blow this ship to hell right here and now."

She stared at me, horrified. "Don't you care about your own life?"

I found myself shaking my head. "No. I don't give a damn. Death doesn't frighten me in the slightest. In fact, it would be a relief."

Randa shuddered, turned, and fairly ran toward the galley and her fellow scientists.

The Skorpis commander called me when there was less than five minutes remaining in the hour. I could imagine what she had been going through: trying to determine if there was some way they could take this survey vessel or incapacitate me before I blew up the ship; weighing the worth of the forty-nine frozen prisoners against the worth of the twenty-two Hegemony scientists; deciding how much recompense to give the warriors who had captured my troopers. Idly I wondered if they ate any of the reptilian Tsihn they captured in battle.

She agreed to the trade, reluctantly. The forty-nine cryo units were carried to my orbiting vessel by a trio of Skorpis landing shuttles. I would not have my troopers destroyed by a matter transceiver. Once I was satisfied that all of the bulky sleeper units were properly attached to my vessel, I allowed the scientists to board the last of the Skorpis shuttles.

Delos stood beside me and watched his team file through the airlock that connected to the shuttle.

"Where will you go now?" he asked me.

"To find someplace that has the facilities to revive my troopers."

"And then?"

"I don't know," I admitted.

"Continue the war?"

"I suppose."

Randa was the last of the scientists in line. As she placed one hand on the rim of the airlock hatch, she turned slightly to look at me.

"Would you really have killed us all for the sake of a gang of frozen corpses?"

I heard the words she did not speak: A gang of frozen corpses who are nothing but soldiers, not quite human, fit for nothing but to fight and eventually die on some ball of rock out among the stars.

"If I had to," I said.

The corners of her lips curled slightly in a malicious smile. "And how do you know that those pods actually hold your precious soldiers? Maybe the Skorpis commander put forty-nine of her own warriors in them, to take you by surprise."

I made myself smile back at her. "The Skorpis commander made an honorable agreement with me. She's a warrior. She'd kill me if she could but she wouldn't deliberately lie to me."

"You think not?"

"She doesn't have the same set of

values that you do," I said.

Randa's eyes shifted from me to her husband. "Let's go," she said to Delos, "and leave this madman to his frozen soldiers." With that she ducked through the hatch.

Delos looked up at me with eyes that were almost sad. "Somehow I get the feeling, Orion, that I would learn a lot more about the Universe by going with you."

"Be my guest," I said.

But he shook his head. "I wish I could. I'm not a soldier, but I have a duty to perform. And I know my place."

"Maybe you can help to end this war."

"How?"

"I wish I knew."

He put out his hand to me. "We're on opposite sides, I know. But—good luck, Orion. I wish there really was a way to end this war."

"Search for it," I said, taking his hand.

CHAPTER 18

Part of my agreement with the Skorpis commander was that she allow me to leave the Lunga system. Alone now in the survey vessel, I broke orbit and headed in the direction that the Tsihn fleet had taken. The Skorpis battle cruisers remained in orbit, but I knew that as soon as their commander decided to, they could overtake me and blast me into vapor.

The survey vessel was not capable of light-speed. The only safety I could hope for was to find another Commonwealth ship in normal space. A forlorn hope, I realized. Space is vast, and most of the ships traveling through it go to super-light velocity as soon as they can, which puts them completely out of touch with turtle-boats such as mine.

But I had another means of communicating.

I put the ship on autopilot, with instructions to warn me if any Skorpis or Hegemony vessels appeared nearby. Then I leaned back in the pilot's chair, closed my eyes, and reached for contact with the Creators.

This time it was easy. The Golden One appeared immediately, decked in a magnificent glowing robe. He seemed to be hovering in the emptiness of interstellar space, a splendid god radiating power and glory.

"What a strange ape you are, Orion," he said. "Threatening to kill yourself if the enemy refused to return your troopers to you."

"I've died before," I said. "There's no great trick to it."

"But you expect me to revive you each time."

Vaguely I recalled a slight, soft-spoken Hindu with dark skin and large liquid eyes. "It would be a relief to be taken off the wheel of life," I said.

"You seek nothingness? Oblivion?"

"It would be an end to pain."

Aten smirked at me. "Your nirvana is not to be, Orion. Not yet. I have further chores for you."

"First revive my troopers," I said. "Awaken them and allow them to live normal human lives. They deserve that much, at least."

"They will be revived, I promise

you. I haven't given up hope of enlisting the aid of the Old Ones and similar ancient races. Your troopers will help you to establish the next point of contact with them."

"End this war," I urged him. "Stop the killing. What's so important that it makes you send billions to their deaths?"

"What's so important about those billions that it matters when and how they die? They're creatures, Orion. Creatures. My creations. I can use them as I choose. I use them as I must."

"Why should we help you to carry on this war? What's the point of it? Why can't you stop it?"

Aten shook his head as if disappointed in me. "How little you understand, my creature. Don't you think I would end the war if I could? It isn't that easy, Orion."

"Why not?"

"If it takes two to make a fight, it also takes two to make peace. Anya and her ilk won't stop fighting. They want their way, and that way will lead us all to utter disaster."

"She must think differently."

"She is wrong!"

I thought, if only I could find Anya, speak with her, learn why she is fighting, what her goals are.

But the Golden One read my thoughts as easily as if I had spoken them aloud. "She would kill you out of hand, Orion. The goddess you love now seeks only blood and vengeance. Anyone serving me is her enemy and she will destroy them. She is my enemy, Orion. And therefore she is your enemy."

No, I thought. She could never be my enemy.

"Fool," spat Aten. And he disappeared from my awareness.

I was back in the cockpit of the survey vessel. Warning lights on the control board were blinking red, the contact alarm beeping annoyingly.

The screen showed a lone vessel, a sleek scout ship moving at nearly light-speed toward me. Cranking-up the sensors to maximum magnification, I saw that it bore the hexagonal symbol of the Commonwealth.

It was a Tsihn ship. Its captain appeared on my display screen, small and slight, scales rippling pink and pale yellow.

"You are the survey vessel from the *Blood Hunter,*" it told me, rather than asking me. "The humanoid known as Orion."

"That is correct."

"Good. You will be attached to my ship and then we can haul our eggs out of this region before a Hegemony cruiser spots us."

I stayed aboard the survey ship while the Tsihn scout sent out an EVA team to grapple my vessel and attach it to theirs. Once we were safely linked to them, the scout ship accelerated to light-speed and made the jump to super-light velocity.

The Tsihn captain did not invite me aboard its ship. It seemed to want to have as little to do with me as possible. Its orders had been to penetrate the area where I had jumped away from the *Blood Hunter,* find me and bring me back to the nearest Tsihn base. Its orders did not include hospitality or even civility.

The Tsihn base was not a planet, but a massive motile station nearly a hundred light-years from the Lunga region. It hung in the emptiness of interstellar space, outlined against a distant bright swirl of gas and dust glowing red and blue in fluorescence stimulated by a cluster of newborn hot, blue stars a few light-years away.

There was a human section to the station, and I was brought there by a Tsihn escort, not knowing whether I was going to receive a medal or a court-martial.

I got neither. The human chief of the section was a grizzled old brigadier named Uxley with prosthetic legs and a permanently bleary expression on his baggy, sagging face. I was brought to his office by my Tsihn guards, who wheeled about and left without a word or a salute. I stood before his desk at attention.

"You're being put in charge of a battalion, Orion," Brigadier Uxley told me, with no preliminaries. "Don't ask me why. Somebody higher up in the chain of command must either have enormous faith in you or wants to see you dead. Maybe both."

He was clearly unhappy over me. I had no rank, not even a record in his personnel files. As far as he was concerned I was the protége of some high-ranking officer or politician, with no real military experience. He was, of course, more right than he could know.

"There's a little piece of rock called Bititu," he said, flashing an image of a black, pitted asteroid on his wall screen. "What its strategic value is, no one in the upper echelons has seen fit to tell me. But it's to be taken by you and your thousand. And damned quick, too."

"Sir," I said, still at ramrod attention, "I would like to have the survivors of the Lunga mission as part of my command."

He fixed me with a bloodshot eye. "Why?"

"I know them, sir, and they know me. We work well together."

"Do you?" He looked down at the display screen on his desk for several moments. I could not see the screen, but from the reflection of light on his face I could tell he was paging through a considerable amount of data very quickly.

Finally he looked up at me. "You pulled them out of a Skorpis depot? Single-handed?"

"I negotiated for them, sir."

His attitude softened appreciably. Leaning back in his padded chair, he pointed at me with a rock-steady finger. "You're not regular army, are you?"

"No sir."

"Yet you went in there and got our troops away from the Skorpis."

I said nothing.

"All right, you can have them with you. I'll even add them to your command, since you're already slated for a full battalion. The sergeant outside will show you where your quarters are. Better start spending every waking second on studying Bititu and the Hegemony's defenses of it."

"Yessir." I saluted and left his office.

And went straight to the cryonics center where my troop was being revived. It was a big chamber very similar to the one where I had first awakened in this era. The medics had removed forty-nine of the chamber's regular cryosleep units and placed my troopers' capsules on their foundations. They were all plugged in to the chamber's environmental controls and computer systems. Frede was in one of those pods. And Quint, Jerron and the others. Frozen inside dull metal canisters inscribed with Skorpis symbols. The capsules looked old, heavily used. But I saw no vapor leaking from them; battered they might be, but they still worked as they should.

"They won't be coming out of it for another six hours, at least," said the medic on duty at the control station. Her voice echoed off the metal walls.

"It takes that long?" I asked.

She waggled one hand in the air. "Slower is better, once the body cells have been defrosted. Pump nutrients into them, stimulate their brains to restart, let them dream and sort out whatever memories were locked in short-term storage when they went under."

Their short-term memories must be terrible, I thought. The last thing they would remember would be the Skorpis freezing them for their food larders. Did they struggle? Try to fight? Or go under resigned to their miserable fate, convinced that they had been abandoned by their leaders?

"And besides," the medic added, "we just got orders to feed some new training into them. So while we're letting them come back gradually we can program this new material into their neural systems."

I didn't bother to ask what the new training material was. I knew they were being programmed with everything the army thought they needed to know about Bititu. I decided to go back to the cubicle they called my quarters and start to study up on the asteroid, too. It wouldn't do for my troops to know more about the operation than I did.

But first I asked the medic, "Could you tell me when they wake up?"

"I'll be off duty then," she said.

"Well, how long will it take? What time will they start to come out of it?"

"Another six hours. I already told you."

I thanked her and hustled back to my quarters. I spent the six hours studying Bititu, grateful that I did not need sleep. What I learned of the asteroid was not encouraging.

Bititu was an asteroid in the Jilbert system, a seven-mile-long chunk of barren rock, roughly kidney-shaped. Jilbert itself was a dim red dwarf star with only one true planet, a gas giant orbiting so close to the star that they were almost a binary system. The rest of the system was nothing but asteroids, an unusual state for the planetary system of a dwarf star.

The Hegemony had apparently fortified Bititu heavily. According to the reports I scanned, the asteroid was honeycombed with tunnels defended by a full regiment of spiderlike creatures that the reports referred to only as the Arachnoids. Very little was known about them; even their intelligence was in some doubt. Some scientists believed that individual Arachnoids were not intelligent, in the sense of being self-aware and motivated, but were instead part of a collective hive mind, as many species of insects have proven to be.

The most discouraging part of the reports was the admission that not much was known about the Arachnoids because none had ever been taken alive. They always fought to the last member. Not a happy prospect for those who had to do battle against them.

Then I saw that the Commonwealth's scientific community requested that we take as many of the Arachnoids prisoner as possible, for them to interrogate and study. The phrasing of their request made it clear that they thought we soldiers slaughtered all the Arachnoids deliberately.

"Despite their non-humanoid appearance," the scientists' request read, "the Arachnoids are to be treated as full sentient, intelligent beings. Indiscriminate killing of these creatures is punishable by military code."

I turned off the video reader with a feeling almost of disgust. Bititu would be a bloody mess, it seemed. There was no way to take the asteroid except by direct assault and the enemy was well entrenched and willing to fight to the bitter end. I doubted that the Arachnoids would willingly allow themselves to become prisoners and objects of our scientists' eager investigations.

With my mind full of foreboding I went down the metal passageway of the station back to the cryonic center.

A different medic was on duty now, a gray-haired male whose face was also a grayish pallor, as if he had not seen the sun in years.

"They're coming around," he whispered as I looked out across the big room filled with the cryonic capsules. His attention was focused on the dozens of display screens set into the curving panel before his chair like the faceted eyes of a giant insect.

I felt the chill of cryonic cold seeping into my bones. "Shouldn't it be warmer in here?" I asked.

He shot me a disapproving glance. "I know what I'm doing, soldier."

"Yes," I said. "Of course."

"They're going to be disoriented for a bit. The briefings they've been getting while we're pulling them out will be mostly subconscious, until they're brought to the surface by trigger phrases."

The trigger phrase, I knew, was simply the name of the target asteroid: Bititu.

"The last real memories they'll have will be whatever they saw when they were put under."

Skorpis warriors forcing them into the cryo pods. Knowing that they were nothing more than food to their captors, that if they were ever awakened it would be for ritual execution.

"Isn't there some way we can tell them they're safe, that they're not prisoners of the Skorpis anymore?"

The medic glanced at me. "Is that what happened to these soldiers? They were frozen by those damned cats?"

"Yes."

"Shit on a goddamned mother-loving sonofabitch sandwich," he snarled, his fingers suddenly playing across the control keys. "Nobody tells me any pissing thing. Same old army. If there's a way to screw things up. . . . " His voice sank to a disgruntled mumble.

At last he looked up from the controls and displays. "It's too pissing late. There's nothing I can do. They're going to start waking up in a few minutes and they'll still be thinking that they're prisoners. If we don't have a couple of heart attacks among them it'll be a pissing miracle."

My mind raced. Was there anything I could do? Could I reach out to them mentally and assure them that they were safe, that they had nothing to fear?

Too late. I heard a click and a sighing sound. Looking across the chamber I saw one of the capsules pop open, white vapor issuing from it like fog seeping across a graveyard at midnight. Another clicked and sighed. Then more.

Someone moaned. Someone began to sob like a motherless child. Which we all were, of course.

I rushed to the nearest capsule. I saw a trooper struggling to a sitting position, eyes wide with fright.

"It's all right," I shouted, my voice echoing off the chamber's metal walls. "You're safe. You're not a prisoner anymore."

One by one the pods opened up and my troopers awoke. Many of them were ashen-faced, trembling. Others sat up with fists clenched and teeth gritted, ready for a fight. I saw that most of them were bruised, lips split, eyes swollen, clotted blood matting their hair. They had not gone into those pods peacefully.

I searched through the capsules for Frede's pod. She was just opening her eyes when I found it.

"Orion?" she asked as I leaned through the vapor steaming out of her capsule. "They got you, too?"

A heavy blue-black bruise swelled her cheek. I saw slashes on her arms where her sleeves had been torn.

"No," I told her. "I got you back from them. You're safe. It's all right."

"Safe?"

"We're in a Tsihn station. I got you back from the Skorpis."

I helped her up to a sitting position. She seemed dazed, disoriented. "We're not prisoners? Not. . . ."

"You're not prisoners anymore. You're safe."

She looked around, blinking her eyes. "Sheol, do I have a headache," she muttered. Then she threw her arms around my neck and kissed me so hard that the rest of the barely-revived troopers whooped and whistled.

And then someone screamed, as if in agony or mortal terror. I pulled away from Frede's embrace and sprinted to the pod. It was Lt. Quint, screaming horribly, still lying on his back with his eyes squeezed shut, his hands raised defensively in front of him, his legs churning as if he were trying to run away.

"Quint, it's all right!" I yelled into his contorted face. "You're safe."

He kept on screaming as if he could not hear me. I reached into the capsule and grabbed the front of his shirt, yanked him halfway up and shook him violently. Still he screeched, eyes closed, jibbering incoherently.

I slapped his face. Even as I did I noticed that he was unbruised. Shaking him again I shouted, "Wake up! It's me, Orion. You're safe."

He was trembling uncontrollably, but he opened his eyes and stared at me.

"You're not among the Skorpis," I said, more gently. "It's all right. There's nothing to be afraid of."

A few of the other troopers had gotten shakily to their feet and gathered around Quint's capsule. I smelled something foul, and realized that Quint had emptied his bladder and his bowels, either when the Skorpis had shoved him into the pod or just now, as he awoke.

I waved the other troopers away before they smelled it. "Fall in," I said. "Give the lieutenant a minute to pull himself together."

I had them line up, leaving Quint in his capsule. They were bruised, cut, uniforms tattered and dirty, but alive and grinning at me.

"There must be a sorrier-looking bunch of mongrels somewhere in the army," I said to them, "but if there is, I hope I never have to look at them. Sergeants, get these mutts cleaned up, find their assigned quarters, and see that they're issued fresh uniforms and kits. Officers, come with me."

I knew that the remaining sergeants among my troops were experienced veterans who knew how to maneuver their squads through a camp, whether it was on some alien planet or an interstellar way-station, such as this was. I wanted the troopers out of the chamber before I dealt with Quint.

He was a mess, both physically and mentally. Frede was the only other surviving lieutenant, and it took the two of us to coax Quint out of his pod and down to the medical rehab center. The gray-faced medic who had supervised the revival process came with us.

"I've seen this before," he told me as a pair of robot nurses took Quint gently in their metal grips. "He won't be fit for active duty until he's been completely deprogrammed and retrained. Maybe not even then."

"What will happen to him, then?" I asked.

The medic shifted his shoulders beneath his white jacket. "Oh, they'll assign him to some desk job, I suppose. He'll be perfectly adequate to send other troopers into battle; he just hasn't got the stuff in him to face battle himself, anymore."

I should have felt pity for Quint, I know. Instead I felt a smoldering resentment, almost anger.

Frede read my face. "He can't help it," she said. "He's not goldbricking."

"How do you know?"

She shrugged. "What difference would it make?"

I realized she was right. What difference would it make? Despite all the training, despite being gestated specifically to be a soldier, despite a lifetime of nothing but the military, Quint had taken all the fighting he was ever going to take. I should have seen it coming. I should have realized that while we were fighting for our lives on Lunga he was hiding in a hole somewhere, keeping his head down, unwilling or unable to face the death that the rest of us did not even think about in the heat of action.

"It's not a good thing for soldiers to think too much," Frede told me as we left Quint to the medics and went to find our quarters and the rest of the troop.

"Maybe not," I muttered, thinking of Randa, who did not really believe soldiers were capable of thinking at all.

"You're now my second-in-command," I told her as we walked along the metal passageways, guided by the computer displays on the bulkheads. Most of the others in the passageways in this section of the station were humans, although we passed several Tsihn and even a few other species.

She nodded. "Are we going to stay here on this station, or will they ship us to an R&R center?"

"No R&R," I said. "We've got a new assignment."

"Without a rest and refit from the last one?" She was immediately indignant.

I suddenly realized that it was my fault. "I asked for you," I said, "when I got the assignment."

"What assignment?"

"Bititu. It's an asteroid in the—"

I stopped. Frede's eyes seemed to glaze over for a moment. The trigger word. I could have kicked myself. All the data from the subconscious briefing came surging up into her awareness.

"Sheol," she murmured. "They don't give you the easy ones, do they?"

"I shouldn't have asked for you," I started to apologize. "Maybe I can get you released for R&R."

"Not now. Not once we've been briefed. They'll either ship us out or freeze us."

We started walking along the passageway again. I didn't know what to say. It had never occurred to me that the troopers deserved a spell of rest and recreation after their ordeal on Lunga. Bititu promised to be even worse.

"There's one glitch in the planning that I'll have to fix," Frede told me as we approached the section where we would be quartered.

"What's that?" I asked.

"The sleeping arrangements. They've paired each of us off with other people."

"That's standard procedure, isn't it? The army doesn't want us forming emotional attachments that are too close."

"Right. But you're battalion commander now and rank has its privileges.

"I don't know if I should—"

"Not you," Frede said, her eyes twinkling mischievously. "If I'm your second, then I can pull *my* rank to supersede the bitch they've assigned to you."

CHAPTER 19

So when we boarded a Tsihn troopship for the flight to Bititu, Lt. Frede was my second-in-command and my bunk mate.

Our ship joined a sizable battle fleet of cruisers and dreadnoughts. The plan was to make the run to the Jilbert system at super-light velocity, so we could not be detected until the very last moment, when we slowed to relativistic speed. Navigation was going to be tricky, but the Tsihn admiral assured me that they could get us to within a few light-hours of Jilbert.

"In that way," it told me at one of our conferences in its quarters, "the Hegemony will have no warning time to reinforce the system."

Its conference room was hot and dry, like being in a sun-baked desert, except that we were seated around an uneven conference table. Half of the table was set at a height to make humans comfortable, the other half several centimeters higher for the comfort of the big senior officers among the reptilians. The admiral, of course, was the biggest of them all: nearly three meters tall when standing, the dun-colored scales of its chest almost completely covered with symbols of rank and distinction.

The walls of the conference room were filled with holograms of arid rocky country and a blazing bronze sky. I was tempted to shield my eyes from the sun, but the brightness actually was never high enough to cause real glare.

"The nearest Hegemony base to Bititu is in the Justice system," I pointed out. "That's only a dozen light-years away. The enemy could send a battle fleet to Bititu before we've secured the asteroid."

The admiral flickered its forked tongue in and out almost faster than the eyes could follow, its way of working off nervous energy.

"We will remain in the Jilbert system until you have secured the asteroid, never fear," said the admiral. "My fleet is powerful enough to take care of any Hegemony attempt to reinforce Bititu."

I remembered the way the Tsihn fleet had bolted from Lunga and stranded us.

"In point of fact," said the admiral, tongue flickering blurrily, "we are hoping that the Hegemony will attempt to interfere. It will give us an opportunity to destroy one of their fleets."

I was glad to hear that it was so confident. Glancing along our end of the conference table to Frede and my other officers, I saw that none of us humans shared his opinion.

My battalion spent most of the flight in training. We converted the troop ship's passageways and compartments into mockups of the tunnels and caves we expected to find on Bititu and practiced storming through heavily defended positions, day after day. There was no room for subtlety in our tactics. It was just brute force and firepower. I knew the casualties would be high.

"Why doesn't the fleet just blow the goddamned asteroid out of existence?" Frede asked one night in our bunk. "Why do we have to take it?"

I had no answer, except, "Maybe the Commonwealth wants to use it as a base for themselves after we've driven out the Hegemony."

"You know what I think," she asked, then went on without waiting for my reply, "I think it's those double-domed scientists. They want Arachnoid specimens to study, so we get stuck with the job of trying to capture some of them."

"But according to our briefings, the Arachnoids fight to the last one," I said.

"Tell it to the scientists."

"Still," I said, thinking aloud, "the fleet could bombard the asteroid before we go in, pound it as hard as they can. It wouldn't hurt the Arachnoids deep inside the rock, but it could knock out any of them up by the surface."

"And make our landing easier," Frede said.

But when I took up the question with the admiral's chief aide, a reptilian about my own size with beautiful multi-colored scales, the answer was: No preliminary bombardment. It would merely alert the Arachnoid defenders and delay our landing.

"But once we show ourselves in the Jilbert system, several light-hours away from the asteroid, won't that alert them?" I asked.

"No preliminary bombardment," the reptilian repeated. "The plan is set and will not be changed."

I demanded the right to ask the admiral about it. Permission denied. I got the impression that the strategists who had planned this operation wanted to capture Bititu as intact as possible. They were perfectly willing to trade our lives in exchange for killing off the defenders without wrecking the asteroid itself.

I had other ideas.

I assigned Frede and my other officers to studying the pictures of Bititu as minutely as possible. I myself spent most of my nights going over those maps, pinpointing each spot on that pitted bare rock that looked like an airlock hatch or a gun emplacement. Then, one by one, I assigned each of those targets to one of our heavy weapons platoons.

My plan was to knock out those surface defenses as we rode toward the asteroid in our landing vehicles. Instead of sitting inside and waiting passively until we touched down on the surface, I ordered my weapons platoons to zero in on specific targets and destroy them while we were in transit from the troop ship to the asteroid.

Otherwise, I feared, the Arachnoid defenders would blast our ships out of the sky before we reached the rock.

As we neared the Jilbert system I worked the troopers harder and harder. Little sleep and less rest. We raced through the ship's passageways every day and almost every night. When we were not physically assaulting our mock targets we were studying the imagery of Bititu, familiarizing ourselves with every crevice and hollow of its surface, picking out the precise spots where each landing vehicle would touch down on its surface.

Some of the troopers began to complain that by the time we reached our target they would be too tired to fight. I drove them harder.

"We go relativistic in six hours," the Tsihn liaison officer told me at last. "Then two or three hours to the point where you embark for the asteroid."

I got my troops ready. We marched to the loading docks where our landing vehicles waited, singing ancient songs of battle and blood. We got into our armored spacesuits, using the buddy system to check each other carefully. The suits had been anodized white at my insistence; in the dimly lit tunnels of Bititu we had to be able to see each other. No one knew what the visual range of the Arachnoids was, whether white stood out as clearly to them as it did to us, but I was determined to avoid killing ourselves with friendly fire.

I put the heavy weapons platoons in the first of our forty landers, with the other platoons' landers coming in behind them. I put myself in the first of the weapons platoons.

As the troops clambered aboard the landers, awkward in their heavily-armored suits, Frede came up beside me, her helmet visor raised, an odd expectant smile on her face.

"Well, we're as ready as we can be," she said, her voice trembling ever so slightly.

"Make certain your weapons team hits every assigned target," I said. "Especially the airlocks. Maybe those spiders can breathe vacuum, but I doubt it."

"I never liked spiders," she said.

"Now's your chance to kill a few thousand of them."

She nodded inside the space helmet, then slid the visor down and lumbered off to her landing vehicle. I clamped my visor and sealed it. I had done everything I could think of. Now it was us against them, with no mercy expected either way.

The landing vehicles were little more than armored shields with handgrips for the troops and propulsion units hung off their sterns. We pushed off the troop ship, forty landers, and slid out into the darkness of space.

"Here we go," said one of the troopers. I heard his tense, shaky voice through my helmet earphones.

"Another free ride, courtesy of the army."

"Enjoy your trip."

"Yeah. You gotta be born to it."

No one laughed.

The sullen red star off in the distance gave very little light. The dark, pitted rock of Bititu seemed to float out there among the stars, a long way off. And we seemed to be hanging in the middle of the emptiness, barely moving. As I clung to the hand grips behind the forward armored shield, in the midst of the heavy weapons platoon, I had to turn my entire body around to see the troopship we had just left. Farther in the distance hovered hundreds of battle cruisers and dreadnoughts, sleek and deadly, with enough firepower to atomize Bititu and its fanatical defenders.

We slowly, agonizingly drifted toward the asteroid. I felt naked and alone despite my armored spacesuit and the soldiers surrounding me. Not a sign of life from the asteroid. Not a glimmer of light. It merely hung there, growing slightly larger as we slowly approached it, a massive elongated chunk of rock, pockmarked with craters and scored with strange grooves, dark and solid and ominous.

I checked the watch set into the wrist of my suit. I had set it to count down to the instant when we would begin firing at the surface facilities. A hundred and nine seconds to go. A hundred and nine eternities.

At last I saw something glint on the asteroid's surface. The reflection of sunlight? No, Jilbert was too faint and red to make that kind of glitter. Then another, and the front shield of one of our landers flared with the impact of a laser blast. Missiles were leaping from hidden fissures in the asteroid, blazing toward us. Our bombardment plan was instantly forgotten as we began to shoot at the missiles. They exploded in silent fireballs, each one closer to us as we drove onward toward the asteroid.

A lander was hit, bodies and fragments scattering, tumbling, flailing through the dark emptiness. Another, and then another. Dying voices screamed in my earphones.

"Fire at the surface targets!" I bellowed into my helmet microphone. "Heavy weapons, fire at the surface. All other platoons, anti-missile fire."

My well-trained troops began shooting at the targets we had picked out. But the enemy was firing missiles from spots that had looked like nothing but bare rock until a few moments earlier. A missile exploded scant meters from my lander, I could feel the heat of its flare even through the armor of my space suit. Fragments ripped into us, clunking against our armored suit. A trooper's oxygen tank exploded in a brief deadly flare of flame, killing him instantly.

We were hitting the ground targets, I could see. Explosions peppered Bititu's surface. Missiles were still blazing toward us, several more landers were blown away, but we were hurtling toward the surface now. We would be there in a few seconds. Smaller weapons were blasting at us now, I could feel the lander shuddering as small solid slugs racked us. A trooper was hit just next to me, spacesuit erupting into fountains of gushing blood that froze in the vacuum into solid red pellets.

We huddled behind the lander's forward shield as lasers and projectiles racked the vehicle from one end to the other. Half the troops on the lander were already killed by the time we thudded onto the asteroid's rocky surface.

I jumped in the negligible gravity, rifle in hand, and blasted a partially-open hatch set into the rock. It snapped shut. It took an effort to keep from soaring into space; I adjusted the flightpack on my back to negative and felt some semblance of weight that helped me to flatten onto my belly while laser beams and volleys of slugs zipped over my head.

My earphones were ablaze with frantic voices:

"They're all around us!"

"I've got 70 percent casualties! We've got to get off this rock!"

"Where's the weapons platoon? I need backup. *Now!*"

I slapped a magnetic grenade on the hatch and backed away. It blew noiselessly in the vacuum, smoke dissipating almost before my eyes registered its presence.

"Get into the tunnels!" I yelled into my helmet mike. "The only troops left on the surface are going to be the dead. Get inside! Move!"

I rolled another grenade into the opening of the blasted hatch, then slid into the tunnel head first, spraying rifle fire into the murky shadows to clear out any defenders who might have survived the grenade.

The tunnel was barely wide enough for me to crawl through and so dark that I had to turn on my helmet light, despite the infrared sensors in my visor. I heard something slithering behind me and rolled onto my back, aiming my rifle down the length of my torso.

"It's just me, sir!" came a trooper's voice, and I saw a space-suited figure, as anonymous as a faceless sculpture, crawling down the tunnel behind me.

Rolling onto my stomach again I came face to face with my first Arachnoid. It was black, fully a meter wide, with eight spindly legs covered with what seemed like barbs. It held an oblong object in its front two claws, something with fins and a glass-like lens pointing at me. Behind that weapon I saw a face with horizontal mandibles clicking rapidly and eight glittering eyes, no two the same size.

I ducked my head, digging my visor into the bare rock of the tunnel, and pulled the trigger of my rifle at the same time. I felt a blast of heat against the armored top of my helmet, heard a high-pitched wail and the scuttling sound of claws on rock.

When I looked up the spider was gone, but there was a patch of sticky puss-yellow goo on the tunnel floor where it had stood. I saw a side tunnel veering off from this one. Pulling a rocket grenade loose from my belt, I set it for impact and fired it down the side tunnel. It exploded almost immediately, showering me with a hail of pebbles and dust and smoke.

I crawled past the side tunnel, ordering the trooper behind me to take his buddies along it. My earphones blazed with frantic voices:

"There's millions of 'em!"

"They're behind us! They're all around us!"

"We've gotta get out of here! There's too many of 'em!"

There was no way out of here. We could not get back aboard the landers even if we wanted to; they had lifted off the asteroid as soon as we had disembarked.

Slithering forward on my belly, I peered deeper into the tunnel. For a few moments I saw nothing, but I realized I could hear scraping noises and eerie, whistling screeches. Somehow there was enough air in the tunnel to carry sound, or maybe the rock itself was conducting sound waves. Farther off, I could hear the *crack, crack* sound of lasers firing so rapidly that it became an almost continuous clatter of noise. And explosion, some of them big enough to shake the tunnel. Dust and screams and voices shouting.

"There's more of 'em!"

"It's like a trap door. Look out!"

The tunnel was widening. The light on my helmet was deep red, not much help in seeing, but Intelligence hoped that the Arachnoids's eyes could not see that end of the visible spectrum. It occurred to me that if we could produce sensors that detected wavelengths our eyes could not see, the Arachnoids might similarly have developed technology to aid their natural senses. So I switched off the lamp and inched along the black tunnel, depending on my visor's infrared sensors to warn me.

Something exploded somewhere behind me, too big an explosion to be one of our grenades. A cloud of dust roiled along the tunnel. Then I heard that scraping, skittering noise again and a spider popped out of another side tunnel. I blasted it in half with a bolt from my rifle. Edging to the lip of the tunnel entrance I peered into the darkness. My visor showed the faint outline of something in there, inching slowly toward me. I waited until it became clear. Another spider. I killed it with a shot in the middle of its eye cluster.

I worked my way past the sticky remains of the Arachnoid. The tunnel was almost high enough for me to get to my hands and knees, and getting wider all the time. The Arachnoids, I realized, needed more width than height to accommodate the shape of their bodies.

"My squad's down to six effectives. We've got to get out of here!"

"Keep moving toward the center of this rock," I bellowed into my helmet mike. "Nobody's getting off until the last spider's killed."

"Look out, sir!"

I rolled over and saw half a dozen Arachnoids dropping out of a hatch in the top of the tunnel, behind me. The trooper who had shouted the warning fired at them. Two of the spiders rushed at me. I shot the first one in the belly, it was that close. The second was on top of me, jamming its pistol against my chest and firing point-blank. I knocked the gun away with the butt of my rifle as the beam cracked my suit armor and burned my flesh. With a roar of pain I pressed the muzzle of my rifle against the spider's underside and fired. The Arachnoid exploded, spattering the tunnel and me with sticky yellowish pieces.

The trooper behind me was dead, his head blown off, but there were two dead spiders beside him, and another of them twitching its legs helplessly. I finished it with a quick blast from my rifle. My suit was sealing the hole the laser beam had made, fluid edges of the perforation flowing together and quickly hardening. I could feel the medical systems inside the suit spraying a disinfecting analgesic on my burn.

But my thoughts were on the sixth of those Arachnoids. The one that was not accounted for. It must have scuttled down one of the trap doors that lined these tunnels. Was it lurking just behind one of the hatches, waiting for me or some other unsuspecting trooper to pass it so that it could pop out again and kill more of us?

In the distance ahead of me I saw a dim light and made my way toward it. Several tunnels came together in a hollowed-out area; the walls were smeared with something fluorescent that gave off a faint, sticky greenish-yellow light.

I hesitated. I could hear sounds of lasers firing and the dull thumping explosions of grenades echoing down the tunnels. This little cavern seemed to be a nexus of some sort, yet it was apparently deserted, undefended. I heard screams of pain and shouting from one of the tunnels, and then a trio of Arachnoids came scuttling backwards toward the cavern. They turned around as they came into the wider area. One of them slid a claw into a crack in the tunnel floor and a hatch—cleverly concealed to look like a natural piece of the rocky floor—slid open.

Just as the spider did that, its companions spotted me. I fired at the two of them as the third popped down the open hatch. My rifle blast blew the first Arachnoid to pieces and chopped a leg off the second. It fired back, charring the shoulder of my suit. My second shot killed it.

I realized that the spiders did not seem to be wearing any protective clothing. Maybe they *could* breathe vacuum, I thought, although there was definitely air of some kind in these tunnels. I had no time for investigation. The third one lobbed a grenade at me. My senses shifted into overdrive and I saw it soar slowly up from the open hatch, hit the ground once, and bump along in my direction. I pushed myself backward, down the tunnel along which I had come, as the grenade went off in a shower of rocks and dust. The blast tore the rifle from my hands; flying debris peppered my armor, denting and cracking it along the shoulders and helmet. But it held. I was unhurt, though momentarily stunned.

The spider edged above the lip of the hatch to fire its laser weapon at me. But I was faster, grabbing my rifle and squeezing its trigger even as I dragged it along the ground toward me. The blast caught the Arachnoid in its eyes. It screeched and dropped out of sight.

I crawled to the edge of the hatch and saw a squirming mass of Arachnoids below, dozens of them, with their wounded companion wriggling its barbed legs in their midst. Before they could react I dropped a grenade on them and slammed the hatch shut. The explosion forced it open again.

Several troopers came crawling down tunnels into the cavern. Their armor was stained, scuffed, bloodied. One of them was missing an arm. They collapsed, exhausted, on the rocky floor.

"Officers report," I said into my helmet mike.

One by one they called in. In several platoons the sergeants or even ordinary troopers were the ones to speak; their officers had been killed or wounded. I heard nothing from Frede until almost the end.

"Frede here. We're down to five effectives, all of them wounded. I'm the only one still in one piece."

Studying the locator map on my visor and the red dots that represented the positions of the reporting soldiers, I saw that we had more or less cleared out two levels of the tunnels that honeycombed the asteroid. There were at least four more levels to go. Maybe more. And I was down to about 30 percent of my original landing force.

CHAPTER 20

It grew eerily quiet. In the dim underground shadows, dust sifting through, the fighting had stopped for the moment. The Arachnoids seemed content to wait for us to push deeper, into the next level of tunnels.

I had the medical officer set up his aid station and told the troopers to take a quick squirt of nutrients from the nipples in their helmets. The nutrients included neural stimulators designed to counteract the effects of physical exhaustion and mental fatigue. The troopers called it "joy juice," or "mother's milk," or worse.

I sent a team back to the surface to bring down all the grenades and explosives from the magazines that the landers had left. They caught a few Arachnoids out there, hiding in the wreckage of some of the crashed landers, waiting to snipe at unsuspecting humans.

"We got 'em all," reported the sergeant who led the ammunition detail. Then he added, "I think."

"Were they wearing any kind of protective suits?" I asked through my helmet radio.

"No, sir," said the sergeant. "None that I could see."

The scientists would be interested in that, I thought. I had the grenades and heavier explosives distributed among the surviving soldiers and gave them orders to blanket the tunnels with explosives before moving into them.

"Blast every hatch you see," I told them, "and then blast whatever's on the other side of the hatch. Check every crevice, every crack in the rock. Go slowly, make certain you've cleared the area around you before advancing. Now let's move."

It was slow, painful going. Hours dragged into days. We inched along the tunnels, probing for trap doors and hidden nests of spiders waiting to pounce on us. I called up to the fleet and requested more explosives.

"Do you have anything that can produce a high-temperature flame?" I asked.

The Tsihn weaponry officers conferred among themselves, then called back to me that they could send down drums of chemicals which, when mixed together, burst spontaneously into flame.

"Good!" I said. "Send down all you can."

The Tsihn hesitated. In the image on my visor I could see its tongue flicking nervously.

"These are very volatile liquids," it said. "Very dangerous to handle."

I laughed at it. "What do you think we're doing down here, having a picnic?"

It did not understand my words, but my tone was clear. Within a few hours a shuttle craft took up a parking orbit a scant hundred meters off the asteroid and offloaded dozens of large, bulky drums. A Tsihn officer came down to the second-level cavern that I had turned into my command post. Clad in an armored spacesuit just like the rest of us, the only way we could tell it was not one of us was from the fact that its suit was clean and undamaged.

It explained that the liquids in the drums were hypergolic: mix them and they burst into flame hot enough to melt aluminum.

"Fine," I said. "That's just what we need."

The drums were identified by Tsihn

symbols. They looked like abstract pictures to me, little black blots spattered on the curved sides of the big gray drums.

"You must be very careful with these chemicals," the Tsihn officer kept repeating. "They are very dangerous."

"That's just what we want," I assured it.

The Tsihn left as quickly as it could.

We went to work on the tunnels, pouring a whole drum full of one chemical down one hatch and then tipping over its hypergolic counterpart and moving out of the way—fast!—as a river of flame burst down on the shrieking, skittering Arachnoids. One by one we cleaned out the tunnels, advancing as soon as the flames had died away, crawling through smoke so thick and oily and choking that we sealed our visors and went back onto the life support systems in our suits.

Down level after level we crawled, through the sooty smoke, through the charred heaps of hundreds of spiders. Their flesh crackled and broke apart in brittle chunks as we crawled past them. Even sealed inside our suits the smell was nauseating. This was no longer a battle, it was extermination, I thought. The Arachnoids don't have a chance against the liquid fire. I could see, even in the dim light through my helmet visor, that the fire was so intense it had fused the tunnel walls into a slick, grassy surface.

But they were not finished yet. Not quite.

We had made our way down to the core of the tunnel complex, a large cavern near the heart of the asteroid, big enough for us to stand in. Five major tunnels converged here, and five rivers of flame had poured down into this cavern to turn it into a pit of hell. The floor, the walls, the domelike ceiling were blackened. There had been equipment down here, I could see the charred remains of boxes and consoles, plastic melted and dripping.

But not bodies.

I walked upright, boots crunching on the burned litter, rifle cradled in my arms. Frede and a dozen other troopers were behind me, visors down, gloved fingers on the triggers of their rifles.

"You'd think they'd make their last stand down here," Frede said.

I shook my head inside my helmet. "Not if they're smart. They would have figured out that the fire rivers would all converge here and—"

Four camouflaged doors in the ceiling dropped open and dozens of spiders jumped down on us, firing, screeching weird high-pitched cries. One of them landed on my shoulders, heavy enough to buckle my knees and knock the rifle out of my hands. I saw a horrific set of mandibles snapping at my visor and felt a laser burn my arm. Grabbing at the spider, I yanked it away from me and smashed it against the cavern wall. Its hard shell took the shock, several of its arms sinking their barbs into the armored sleeve of my suit, another two firing pistols into my torso.

I staggered back, still clutching the thing by one of its barbed arms, and reached for the pistol at my hip. My right arm was badly burned but I shut off the pain signals and yanked the pistol out of its holster. The Arachnoid tried to block me with one of its arms but I clubbed the arm away and fired into its clacking, snapping mouth. The beam sawed through the creature's head and came out the other side, splashing against the wall.

Turning as it dropped away from me, I saw another spider clinging to a trooper with several arms and flicking the detonator of a grenade with one free claw. The explosion killed both of them and knocked the rest of us to the floor of the cavern.

With my senses in overdrive I fired at two more of the Arachnoids, pulled a third off Frede's back and blew its head off, then swept half the cavern with the beam of my pistol.

The attack ended as suddenly as it had begun. Four of my troopers were on the ground, dead or dying. None of the spiders was left alive.

I could hear Frede gulping for air through the suit radio. "Thanks," she gasped. "It was going to set off a grenade, I think."

"Suicide fighters," I said. "We won't have any prisoners for the scientists to study."

Frede laughed bitterly. "Tough shit," she said.

I was able at last to tell the Tsihn admiral that Bititu was secure, after four days of intense battle. My casualties were nearly 80 percent. I myself was burned in the chest and right arm.

The admiral congratulated me, although its image in my visor showed no sign of pleasure or even of approval.

"The Hegemony has not seen fit to attempt to reinforce Bititu," it complained. "My fleet has waited here for nothing."

As we were being ferried back to the troopship I wondered why the Commonwealth thought this barren chunk of rock was important enough to kill hundreds of troopers. Apparently the Hegemony did not want to hold onto Bititu badly enough to send help to its Arachnoid garrison.

I shook my head wearily. Was there some real strategic meaning to this fighting or was it all a game that the Creators were playing among themselves, using us and the other alien races we had encountered as pawns for their entertainment?

What difference did it make? Sitting there in the shuttle craft on our way back to the troopship, grimy and bloody and utterly exhausted, I did what all the other troopers were doing. I leaned my head back against the bulkhead and dozed off.

"It is not a game, Orion."

The Golden One appeared before me, radiating light so blindingly bright that I had to shield my eyes with my aching, weary hands.

He seemed deadly serious, none of his usual mocking tone in his voice, his face somber, almost grin.

"The balance of forces in this war is tilting the wrong way," Aten told me. "Anya and her ilk are slowly overcoming my Commonwealth."

"But we took Bititu," I protested, like a child seeking its father's approval. "Isn't that something?"

"Not enough," he said. "The Hegemony did not go for my feint. The fleet waited, but the enemy did not step into the trap we had prepared for them."

"Feint? All that killing was nothing more than a feint?"

"Not quite, Orion. A good strategist always has more than one objective in sight." Some of Aten's old haughty self-importance crept back into his expression. "The military aspect of your exertions did not pay the dividends I expected, but the political consequences may yet bear fruit."

"What do you mean by that?" I asked.

He folded his arms across his chest. "You will see, in due time."

I blinked and was back on the shuttle, amid my wounded, bone-tired, snoring troopers. The shuttle shuddered and thumped as it docked with the troopship, waking all but the most determined dozers.

"Home sweet home," somebody cracked.

"You know," said someone else, "that cryosleeper's gonna look damned good to me."

I frowned. Cryosleep? Is that what these troopers had in store?

They let us rest for two whole days. The severely wounded were sent to sick bay while the rest of us were examined by medics, patched here and there, and allowed to return to our quarters. We slept, we ate, and we slept some more.

On the third day we were handed dress uniforms and ordered to assemble in the ship's biggest cargo bay. It had carried supplies and ammunition on the trip to Bititu; now it was empty. Human officers I had never seen before—all of them in magnificent spotless uniforms heavy with braid and decorations—put us through a marching drill and then paraded us around the big cargo bay to the tune of martial music piped in through the ship's intercom.

They stood us at attention in front of a makeshift dais, and the human officers, together with a handful of Tsihn, made a series of speeches at us, praising our courage and loyalty. Even Brigadier Uxley was there, obviously reading his prepared speech from a screen built into the rostrum that he leaned upon. He had flown out from the sector base to rendezvous with us at one of our navigation points, where we slowed from superlight velocity for a few hours.

"They're piping this ceremony back to Loris," Frede whispered to me as we stood at attention through the long, boring speeches.

Loris. The Commonwealth's capital planet, my memory told me. The only Earth-like planet of the Giotto system, 270 light-years from old Earth itself.

Then the Tsihn admiral read off a unit citation and handed out medals. It seemed like a miserably poor reward for such hard fighting, but the troopers were pitifully grateful for the recognition.

At the end of the ceremony Uxley smiled beamingly at us and announced, "You are relieved of all duties for the remainder of this trip back to sector base six. There you will be reassigned. Dismissed."

Frede came up to me as the troop

broke up into chatting, laughing little groups.

"Ready for some R&R?" she asked.

"Not much to do aboard this bucket," I complained.

"We can grab some sack time."

I caught the gleam in her eye. "For the whole trip back?"

Frede laughed. "That would be fun, Orion, but we've only got another twelve hours."

Puzzled, I asked, "What do you mean? The commander said we're relieved of all duties—"

"That means we're going back into cryosleep," Frede said, her tone sobering. "You don't think they're going to feed us the whole trip back, do you? A few watts of electricity to keep the nitrogen liquified is a lot cheaper than having us underfoot."

"But I thought—"

She gripped my arm, making me wince slightly.

"Oh, I'm sorry! I forgot your arm is still healing."

"You mean that after all the fighting we've done they're going to pop us back into the freezers?"

Frede gave me a sad smile. "We got a unit citation and individual medals and congratulations from the admiral. They beamed the ceremony back to the capital for all the civilians to see. We're official heroes. What more can a trooper ask for?"

I shook my head. "I guess you've got to be born to it."

"Yeah," she said. "Come on, let's make out while we're still warm."

CHAPTER 21

I was an officer, and not a regular army officer at that. I received special treatment. I was allowed to remain awake for the trip back to sector base six.

There was a handful of other human officers on the ship, but they seemed to deliberately avoid me. They were staff officers, not line. I got the feeling that they regarded fighting soldiers as beneath their dignity. Or perhaps they were inwardly ashamed of their soft jobs and did not wish to be reminded that the memos and charts and requisitions they dealt with represented real, living, bleeding men and women who were sent into battle at the touch of a keystroke.

Brigadier Uxley remained on board, riding with us back to the sector base. Uxley was cut from a different cloth than the staff officers. He had been a front-line soldier; lost both his legs in battle. He was a gruff old buzzard who drank too much and liked to talk far into the night. We became friends, of a sort. I could drink with him because my metabolism neutralized the effects of alcohol almost as quickly as I digested it. And I needed very little sleep, from resting several days after Bititu.

We spent the long nights of the flight back to sector base six in the brigadier's quarters, drinking his favorite liquor. The Tsihn quartermaster complained about using the ship's limited supplies of energy to make unauthorized refreshment with the matter transceiving equipment. Uxley overrode the reptilian's objections.

"Damned lizards think they own this sector just because their fleet is operating here," he grumbled to me as we drank the night away.

He liked to tell war stories, and his memory for them became better with each glass of whisky he downed. Unfortunately, he seemed to forget that he had told me several of his favorite stories more than once. He repeated them, night after night, although each retelling was slightly different.

"You're lucky," he said one evening, slurring his words as he poured himself another drink and refilled my glass.

"Lucky?" I asked.

Bobbing his reddened face up and down, Uxley said, "You fought those damned spiders. And the Skorpis before that."

"I wouldn't call that lucky," I said.

Waving a finger in the air, he explained, "You don't understand. You haven't had to fight humans. It's easier to kill aliens. Humans—even those bastards of the Hegemony—that's a little tougher, believe me."

I grimaced inwardly. I had fought humans, killed them face to face with swords and knives, fought for the Greeks at Troy, for the Israelites at Jericho, fought in a thousand different times back on distant Earth.

"I fought humans," Uxley said, leaning close enough for me to smell his alcoholic breath. "That's where I lost these." He thumped on his prosthetic legs.

"It must have been very painful," I said.

"You don't feel the pain. Not at first. Shock. I had both m'legs burned out from under me and I never knew it. Just flopped down on my belly and kept on firing at those Hegemony bastards. Bastards took my legs. I wanted to kill 'em all, every one of them. I got a bunch of 'em, don't think I didn't. When the battle was over I was surrounded by piles of enemy dead. I held my position and killed 'em in droves."

I sipped at my whisky.

"I can still hear 'em," he said, his voice sinking to a whisper. "At night, when I go to sleep. I can still hear the wounded moaning and screaming. Every night."

One evening he asked me if I would like to see the recording of our ceremony, as it was shown to the populace of Loris and all the other Commonwealth worlds. When I hesitated, he laughed.

"Don't worry, you won't have to sit through all the speeches. The news media trimmed our ceremony quite a bit."

I really had no choice. I pulled up a chair next to his as he ordered the voice-activated screen to show the news recording from Loris.

I saw my troop, looking clean and fresh in the dress uniforms they had issued us. Instead of being in the cargo hold of a troopship, we appeared to be out on the surface of an Earth-like planet, beneath a bright blue sky, flags and pennants snapping in a brisk breeze. And we were only one tiny unit on a parade ground that held massed ranks by the tens of thousands. The ground was black with Commonwealth soldiery that had been added to the scene by computer.

I glanced at the colonel. "They make it look good, don't they?" he muttered.

The computer-created band played stirring martial music while a commentator identified my unit as the group that "annihilated the defenders of a key planet in a conquest that took only four days."

Only four days, I thought. Four days in hell.

The entire show was over in less than ninety seconds.

"What do you think?" Uxley asked me as the screen went dark.

I felt anger simmering inside me. "A kernel of fact wrapped in a big phony sugar coating," I said.

He nodded and began to pour his first drink of the evening. "Got to keep the civilians happy, Orion. Got to keep up their morale."

"Really?"

He looked at me through bloodshot eyes. "Hell, man, most of 'em don't even realize there's a war going on unless we show them stuff like this."

"Then why don't they show them combat scenes? Why don't they show some of the tapes our helmet recorders took on Bititu? Then they'd see there's a war being fought!"

Uxley shook his head. "Don't want to scare them, Orion. The deep thinkers upstairs, the psychotechs and politicians, they don't want to upset the civilians with blood and pain. Just tell 'em that we're winning, but there's a long haul ahead. Light at the end of the tunnel. That's what they feed the civilians."

"Crap," I said.

"I suppose it is," Uxley agreed calmly. Then he took a big swallow of whisky. "I believed in this war, Orion. I really believed it was important to fight for the Commonwealth. That's why I joined up. Volunteered. No one forced me. I left my family as soon as I graduated university and joined the army."

"What did your family think of that?"

He shrugged, his sorrowful eyes looking into the past. "Father was proud. Mother cried. My sisters thought I was crazy."

"And now?" I avoided looking at his legs.

"Who knows? Haven't seen any of them in years. We would hardly recognize each other, I suppose. Too much has happened, we've moved too far apart."

"Wouldn't you like to go home?"

He gulped at his whisky. "The army's my home, Orion. I have no other home now. Just the army."

Another night we got onto the subject of his legs.

"They tried regeneration, but something in my metabolism fouled up the process. These plastic jobs are all right, though. I can get around just fine and they only hurt if I have to be on my feet for more than an hour or so."

Then he started once again on the story of how he lost his legs.

"Training, Orion," he told me. "That's the important thing. Training. It's not rational to expect a man to stand and fight when he's being shot at. A sane man would turn and run for safety. Takes training to make him fight."

"Even our cloned troopers?" I asked.

"Yes, of course. They're humans. They want to live, cloned or not. Got to train them to stand up to battle, not to run when all hell's breaking loose on them."

"And train them to kill," I said.

"Oh, yes, killing's an important part of it. No one's figured out how to win a battle without killing, despite all the scientists and computers."

"Brigadier, what's going to happen to my troop?"

"Happen?" He blinked his bleary eyes. "They'll be reassigned, what else?"

"Don't they get any time for R&R? Furloughs?"

Uxley sat up straighter in his chair. "You're talking about troopers, Orion. They were made to fight. That's what they're for. They're not real people, like you and me. We've got families and friends and a life back home. They don't. They're nothing but soldiers. What would they do with a furlough? They've got no place to go, no families, no home except the army."

"But you said you've drifted apart from your family, your home," I pointed out.

"So what? I've still got 'em. They're still there if I decide to go back to them. You've got a family and home, don't you?"

I wondered what to say, finally decided on, "No, I don't. I'm—an orphan."

"Too bad. But the troopers, they're just clones. We made 'em to fight, not to mix with society."

"There's nothing in their lives except battle and training for battle."

"We let 'em have sex, don't we?" he countered with a broad wink.

"Because some psychotechs decided they'd fight better if their aggressive/protective instincts were reinforced by sexual relationships. Is that all they mean to you? A bunch of instincts to be trained and used like weapons?"

Uxley began to look uncomfortable, his face flushing slightly. "Listen to an old veteran, Orion. Being a soldier consists of long months of boredom punctuated by moments of stark terror. We've eliminated the boredom for them. They ought to be grateful."

"And left them nothing but the terror. Is that fair to them?"

"Fair?" His face reddened even more. I didn't know whether he was going to burst out laughing or roar with anger. "Fair? We're fighting a war, man! We need the biggest number of troops we can generate. And the cheapest. We can't go around worrying about their feelings. It'd make them soft, lower their fighting morale."

I tried to make him see the troopers as human beings, fully as human as he himself was, or as he thought I was. But it was useless. Night after night we talked about it, and he always came down to the same statement. "They were made to fight. Otherwise they would never have been made at all. They ought to be grateful that they're alive and able to serve the Commonwealth."

Yes, I thought. Just as I should be grateful that I have been given life after life, all for the privilege of serving Aten and the other Creators.

"What will their next assignment

be?" I asked one night.

Uxley shrugged. "Headquarters hasn't decided yet. Or at least, I haven't been informed."

"Aren't they being retrained while they're in cryosleep?"

"Not yet," he told me. "Not as far as I know."

I began to wonder. And to think. As I lay awake in my bunk after bidding the colonel good-night, I began to consider what the Golden One had told me and what I had seen with my own eyes of this era, this time of interstellar war, this battle among the Creators themselves.

The Golden One had told me that Anya had rejected me, rejected human form, that she was leading the fight against him. I was programmed to believe him, but deep within me there was a shadow of doubt. Anya and I had loved one another through the eons, in every era to which I had been sent. Why would she change now?

The Golden One said that if I found Anya she would kill me as quickly and casually as a man swats an insect. And he would not revive me; perhaps he would be unable to do so, more likely he would be unwilling.

Very well, then, I thought. If I seek out Anya, wherever she is among the stars, and find that what Aten has told me is the truth, then I will be killed and that will be the end of it. The end of all suffering. The end of all my hopes and pains. The end of love.

But if he has been lying to me, if Anya still loves me and wants me with her, then it is lunacy for me to remain locked into this servitude. I should go out and find her.

Love or death. The ultimate stakes of life.

I began to plan.

The Golden One had his own plans for me, I discovered.

Once we reached sector base six I supervised the offloading of my troop's cryosleep capsules. I wanted to begin retraining them for the mission I had in mind, and began to look into how I might tap into the computers that programmed the sleep training systems for the base.

But as I started cautiously playing with the computer terminal in my cramped quarters, Aten appeared to me once more. One instant I was sitting at the desk in my quarters, hunched over the keyboard and display screen.

The next I was on that grassy hillside above the Creators's mausoleum of a city. The sun shone warmly, the wildflowers nodded in the breeze from the nearby sea. Waves washed up on the beach. I knew there were dolphins out there who regarded me as their friend.

A golden sphere appeared in the air before me, blazing radiance, forcing me to throw my arms up over my face and sink to my knees.

"That's better, Orion," I heard Aten's arrogant voice say. "A properly worshipful position."

When I dared to look up, the Golden One had assumed human form, standing before me in his immaculate military uniform.

"You did well on Bititu," he said, almost grudgingly.

"It was a slaughter."

"Yes, but necessary."

"Why?"

"You mean you haven't puzzled that out for yourself, Orion? You who claims to be almost as good as your Creators? You who scheme to find the goddess you're so infatuated with? Why would the Commonwealth want Bititu?"

Not for itself, certainly, I reasoned swiftly. Then it must be valuable for its location. But there was nothing else in the Jilbert system except the fading red dwarf star itself, a single gas giant planet orbiting close to it, and the scattered debris of other asteroids, dead chunks of rock and metal. . . .

I looked into Aten's gold-flecked eyes. "There was once another planet in the system. You destroyed it."

"Two others, Orion," he answered. "We destroyed them both."

"How many were killed?"

He shrugged carelessly. "The Hegemony had planted colonies on these worlds. They were turning them into powerful military bases."

"But what did that threaten?" I asked. "There's no Commonwealth world for a hundred light-years or more."

"So?" he taunted. "Think, Orion. Think."

The only other planet in the Jilbert system was the gas giant, a huge blue world covered in clouds. Beneath those clouds the planet's gases would be condensed by its massive gravity field into liquids. A planet-wide ocean. Of water, perhaps.

It hit me. "The Old Ones."

Aten actually clapped his hands. "Very good, Orion. The Jilbert gas giant is a world on which the Old Ones have lived since time immemorial. Perhaps it is their original home world."

"The Hegemony established their bases in the system in an attempt to establish contact with the Old Ones."

"And to prevent us from making such contact," the Golden One added.

"Now that we've driven the Hegemony out of the system," I reasoned, "you want to try to reach the Old Ones."

Like a patient school teacher, Aten prompted, "And since you are the only person the Old Ones have seen fit to talk to—"

"You want me," I finished his thought, "to attempt to contact them again."

"Exactly."

My mind was churning, trying to set this new factor into my plans without letting Aten realize what my true objective was.

"In that case," I said, "I will need a ship and a crew."

"I can send you there without such paraphernalia," he said.

"And have me tread water in that planet-wide ocean until the Old Ones deign to speak to me?" I retorted. "Can I breathe that planet's atmosphere? Can I eat the fish that swim in that sea?"

He nodded. "I see what you're after, Orion. You want the survivors of your assault team to be retrained as crew for your vessel. Touchingly virtuous of you, to be so loyal to such creatures."

"They are human beings," I said.

"Manufactured to be soldiers. Weapons, Orion, nothing more."

"Your ancestors," I reminded him.

Aten laughed derisively. "So are tree shrews, Orion. Do you feel pangs of conscience for them?"

Before I could answer the entire scene disappeared as suddenly as a snap of the fingers and I was hunched over my computer screen again in my quarters at sector base six.

The computer beeped and my orders appeared on the display screen: I was to command a scout ship and return to the Jilbert system where I could contact the Old Ones and invite them to join the Commonwealth.

I saw to it that my cryosleeping troopers received the training they needed to run a scout vessel. I myself spent almost all my time in the training center with a crown of electrodes clamped to my head as the training computer poured information into my brain. I wondered if this was the way Aten trained me for my various missions throughout spacetime, while I was unconscious.

In a week my troopers were revived and our ship arrived, a sleek disc-shaped scout named *Apollo*. I frowned when I first learned the name; the Golden One had styled himself Apollo to the awe-struck ancient Greeks and Trojans. Aside from the name, though, I found the vessel trim and fit, and my troopers transformed by their cryosleep training into a crew that at least appeared to know what it was doing.

Frede was still my second-in-command, and *Apollo*'s navigation officer. Little Jerron was now chief engineer. Ordinary mutts who had been little more than cannon fodder on Lunga and Bititu now found themselves classified as ship's officers, in charge of weapons, logistics, damage control, communications, medical services. They grinned at their newfound stature, but they took their new duties quite seriously.

And, one by one, each of them thanked me for getting them better duty. Emon, our weapons officer, put it best:

"The longer we stay with you, sir, the better off we'll be. If we live through it."

I believe he was entirely serious.

We spent two days directing the robots that outfitted and stocked *Apollo* with supplies, then we left sector base six and started to run back to the Jilbert system.

Except that we never got there.

CHAPTER 22

Frede and the others were happy to be awake, alive, and running a starship rather than fighting as expendable infantry.

"This makes us more important to the Commonwealth," Frede told me. "More valuable."

"And it's easier duty," said weapons officer Emon. As a sergeant, he had been wounded twice during the assault on Bititu. Frede's official title was now "first mate," which set off a lot of jokes because she once again had jiggered the sleeping assignments so that she shared my bunk.

The bridge was compact, built

more for efficiency than comfort, with five duty stations jammed in cheek by jowl. Tactical command and all the ship's information systems were tied together in the consoles and data screens that surrounded us. From my command chair I could see anything in the ship I needed to see, call up all of the computer files, activate any system aboard the vessel.

We made the transition to superlight velocity as smoothly as if the crew had spent years aboard the ship. As far as their memories and reflexes were concerned, they had. Neural training, whether awake or in cyrosleep, leaves virtually the same imprint on the brain and nervous system as actual experience would.

"What if we could just fly this ship forever," Frede whispered to me one night in our bunk. "Just forget the war and everything and go out among the stars for the rest of our lives."

"Would you like that?" I asked.

"Yes!" She clutched at my bare shoulders. "Never to be frozen again. To be free. It'd be wonderful."

"To be free," I murmured, knowing that in all the eras of spacetime in which I had existed, I had never been free.

"There are others," she whispered. "You hear stories about them."

"About who?" I asked.

"Renegades. Units that disappeared, just walked off into the jungle and never were heard from again. Ships that took off on their own, split from the fleet and ran away forever."

I knew all about renegades. Lukka and his squad of mercenaries, fighting for their lives in the shambles of the Hittite empire's collapse; Harkan and his band of thieves roaming the mountains of Anatolia, searching for his enslaved children; guerrillas from a thousand wars in a thousand different eras.

"And the war," I asked her gently. "Our duty to the Commonwealth?"

She hesitated for a moment, realizing that she was speaking to her superior officer even though we happened to be lying nude in bed together.

"How long have you been serving the Commonwealth, Orion?"

I evaded a direct answer. "Time loses its meaning."

"I've been serving all my life," Frede said. "So have we all. It's all we know, the army. It's all we have to look forward to, until the day we're killed."

There was a trigger phrase, of course, that came with my orders. Whenever the crew began to show signs of humanity, indications that they were thinking of themselves instead of their duty to the Commonwealth, all I had to say was, "Remember Yellowflower."

The planet Yellowflower, according to the Commonwealth's history of the war, had been suddenly and ruthlessly attacked, destroyed by Hegemony forces without a declaration of war, scoured down to bedrock. Four billion human beings had been killed, the planet's entire biosphere totally obliterated. Yellowflower had been the start of the war, three generations earlier.

According to the Commonwealth's history. I recalled the human scientists on Lunga telling me that it had been Tsihn attacks on Hegemony worlds that had started the war.

I stroked Frede's short-cropped hair. "It's not so bad now. We've got this fine ship. As long as we stay in super-light no one can touch us."

"But sooner or later we'll drop back to relativistic speed and re-enter the war."

"Maybe," I murmured, not yet ready to tell her what I was hoping to do.

She fell asleep and I lay on the bunk beside her. As captain of this vessel, my quarters were small but comfortable. Frede was right: the Galaxy is huge, one ship could lose itself among the stars. But what of all the other ships, all the other assault teams and regiments and armies and battle fleets? What right did we have to run away and hide while others were fighting to their deaths, humans and aliens, Commonwealth and Hegemony?

There has to be a way to stop this killing, I told myself. There had to be.

A warning, Orion.

It was a voice from the Old Ones, in my mind. I recognized it instantly. Closing my eyes, I felt a moment of utter cold, the wild plunging sensations of nothingness, and then I was swimming in the warm sea of their ocean once again. A dozen or more of the Old Ones glided through the deep, dark water with me, pulsating colors, tentacles waving as if in greeting.

"Is this the planet in the Jilbert system or am I back on Lunga?" I asked.

"What difference?" came their reply. "In a sense, we are on both worlds—and many others, as well."

I thought I understood. Each of the Old Ones swimming around me came from a different planet. They had all come together to meet with me; each of us was light-years from all the others, yet we swam together in this fathomless ocean.

"You said you wanted to warn me of something?"

Their response seemed to come from all of them, even though I heard it as only one voice.

"Orion, your war grows deeper and more violent. It troubles us."

"I have been asked by one of the Creators to encourage you to join the Commonwealth," I said. "Their reasoning is that, with you on their side, they will quickly end the war."

"In victory for the Commonwealth, at the expense of the Hegemony."

"Yes."

"Since this slaughter began," they said, "we and others of our maturity have remained totally neutral."

"Others?" I asked.

"There are many, many races among the galaxies, Orion. And even between them. You humans have met and interacted with species of your own youthful stage of development. You interact with your own intellectual peers. You trade with them. You fight with them."

"While you older species remain aloof from us."

"From you, and from the Skorpis, the Tsihn, the race you call the Arachnoids, and all the others who have not yet achieved the wisdom to avoid slaughtering one another."

I got the impression of a group of

gray-haired elders watching a gaggle of noisy brats fighting in a sandbox.

"But your war grows more violent," they repeated.

I agreed. "There seems to be no end to it."

"From the onset you slaughtered billions of your own kind, eradicated all life forms from entire planets, blasting them down to their rocky mantles.

"Then you escalated the violence. Whole planets were blown up, as were the two outer worlds in the Jilbert system, blasted into fragments."

"I know," I said.

The voice became grave. "Now the violence is about to escalate again. The Commonwealth has perfected a weapon that can destroy a star. The weapon creates a core collapse of the star; a supernova explosion is the result."

I felt a hollowing sinking sensation in the pit of my stomach.

"This must not be allowed."

"If the Commonwealth unleashes this weapon," I told them, "then the Hegemony won't rest until it develops something similar."

"We will not permit stars to be destroyed."

"Not permit . . . ?"

"Give this message to your Creators, to the leaders of both warring factions: Tell them that if they attempt to destroy a star—they themselves will be eliminated from the continuum."

"Eliminated?"

"The human race, the Skorpis, the Tsihn, all the warring species will be extinguished."

"How? What do you intend to do?"

"The older species have maintained neutrality throughout your squabbles. But we cannot allow you to destroy the very stars on which the continuum hinges. Attempt to attack a single star, and we will eliminate you—all of you—completely."

They spoke with one voice, an implacable finality in their tone.

"Go back to your Creators and tell them what we have said, Orion. The fate of many species depends on their reaction to our warning."

I sat bolt upright on my bunk. Frede lay sleeping peacefully beside me, a little girl's smile on her relaxed face.

The Old Ones were using me as a messenger again. It's not enough that Aten manipulates me, the Old Ones use me to manipulate him and the other Creators.

But then I smiled. Did the Old Ones know my inner thoughts, my plans? I had hoped to use this scout ship to find Anya, somewhere deep in Hegemony territory. Now the Old Ones had given me a reason for seeking her. I had to warn her about the Commonwealth's star-wrecker.

The third watch still had an hour to go when I came onto the bridge and relieved Dyer, my logistics/damage control officer, who had the command. The watch was almost entirely perfunctory; as long as we were in super-light velocity there was nothing to worry about except a possible internal malfunction.

Taking the command chair, I ransacked the ship's computer records for information about the Hegemony.

Where was their capital planet? What kind of defenses guarded it? Would they honor a flag of truce on a Commonwealth ship?

The computer could not tell me, of course, if Anya was in the Hegemony's capital. The data screens showed their capital planet, Prime, in the Zeta system. I viewed their cities and learned their population, history, economy, social customs, politics, military capabilities—much data, little understanding.

The screens showed Prime itself to be a gray, forbidding city of massive stone buildings rising out of dark cliffs into a heavy cloudy sky. Its streets were almost empty, swept by gusts of rain and sleet. Giant Skorpis warriors seemed to be at every intersection, serving as police or militia guards. The people of Prime looked grim, dour, humorless.

"Why the interest in Prime?"

I looked up from the screens surrounding my chair and saw Frede standing, looking curious. At the touch of a keypad I blanked the screens.

"That's where we're going," I said.

"Prime?" she squeaked. "But that's the Hegemony capital!"

The four others on duty in the bridge turned and stared at us.

"I have secret orders," I told her. But I didn't say who the orders had come from. "We're on a mission of diplomacy to Prime."

"They'll blow us out of the Galaxy the instant we drop out of superlight," Frede said.

"Let's hope not."

Reluctantly she followed my command to set courses for the Hegemony capital. I planned to send out message capsules ahead of us once we neared the Zeta system, so the Hegemony defenders would be warned that we were coming and that our mission was a peaceful one. Frede and the rest of the crew thought the Hegemony ships would shoot first and check on our story after we were safely dead. The almost happy air about the ship dissolved into soldierly griping and dread.

There was something more that I could do, of course. That night, while Frede slept, I tried with all my energies to reach across the span of spacetime and contact Anya. Nothing. It was like facing a blank wall too high to climb, too wide to go around.

So I reached out to Aten, instead. Concentrating on my memory of the Creators's city, I translated myself to its timeless stasis in the continuum. I found myself standing atop a Mayan pyramid in the heart of the city, high enough to look out across its broad empty avenues toward the eternal sea. The sun's warmth was tempered slightly by the shimmering golden dome of energy that encased the city.

Aten looked surprised when I appeared. He and several other of the Creators were apparently locked deep in conference, there at the top of the steep stone pyramid. They were all standing together before the sacrificial altar: Aten in a white and gold military uniform; the dark-bearded one I thought of as Zeus in a comfortable tunic and slacks; rust-haired Ares; slim, sharp-eyed Hermes; and the beautiful redheaded woman who had styled herself Hera in the earlier age.

It was Hermes who spied me first; the others had their backs to me as they talked earnestly among themselves.

"Look who's here," Hermes said, touching Aten on the shoulder.

They all turned toward me, wide-eyed with surprise.

Hera smiled maliciously at me. "Who invited you, Orion?"

"The Old Ones," I answered.

That stifled any complaints or jibes they intended to make. "What do you mean?" Aten snapped.

"They have given me a message for you. A warning." I said, "If you try to use the star-destroying weapon the Commonwealth has developed, the Old Ones will destroy you."

Ares glared at me. "How could they know about the star-wrecker? You told them, Orion! You're a traitor!"

"I didn't know about the weapon until they told me of it," I retorted.

"That's true," Aten said. "Orion knew nothing of the weapon."

"Then how could the Old Ones know?"

"They know," I said. "And they will eliminate all of us if you try to use it."

"How credible is this threat by the Old Ones?" Zeus asked.

"What threat?" Aten sneered. "How could they destroy us? We can avoid them by traveling through time whenever we wish. If necessary I can go back to their time of origins and eliminate them."

"I wonder," Zeus muttered.

"Your meddling with spacetime has caused us enough trouble," Hera complained.

"My meddling," Aten retorted, "is what created us. Without me, we would never have come into existence."

Zeus said to me, "Orion, you must give this warning to Anya and her cohorts, too."

"The Hegemony—"

"Is developing a similar weapon," Hera told me. "What did you expect?"

"I am trying to reach Anya now," I said to them.

Aten fixed me with an angry look. "I never told you to do so."

"But I told you that I would find her," I said. "That's what I'm doing."

"In the era of the war?" Zeus asked.

"Yes. I am flying my ship to the Hegemony capital to tell her that you have the star-weapon."

"I told you he was a traitor," Ares snapped hotly.

I ignored him. "Now I must carry the Old Ones's warning to her."

"No," Aten snapped. "You mustn't do that."

"I am already doing it."

"I'll put a stop to that! And to you, too, Orion!"

"Wait," said Zeus. "Perhaps your creature can accomplish what we cannot."

"Nonsense!"

"Anya has been close to this one in the past," Hera said, sneering. "Maybe she will listen to him where she refuses to speak with us."

"It's worth a try," said Hermes.

Ares glowered at me and rubbed his chin. "Aten, if this creature is yours, you ought to control him better than this."

"I can control him!"

"No, you can't," I said. "Not entirely. I came here on my own power, not because you summoned me. I decided to find Anya even when you told me it was impossible."

He smirked at me. "So you think you have free will? That you are not under my command every instant of your existence?"

"I've gone against your commands in the past," I countered.

"Pah!" spat Zeus. "Stop this posturing, both of you. Aten, I suggest you use your creature to make contact with Anya. This threat from the Old Ones must be taken seriously."

His eyes never leaving mine, Aten replied, "Perhaps you're right. Perhaps this pitifully flawed wretch can be useful to us in spite of himself."

I seemed to fall asleep then, as deep and restful a sleep as I have ever known. When I awoke, I was back in my bunk aboard the *Apollo*, with Frede drowsing peacefully beside me. A wonderful warm feeling of joy filled me. I was going to find Anya, I was going to see her again! And I knew that she loved me as much as I loved her. Nothing else mattered.

CHAPTER 23

Frede computed our course to the Zeta system with conspicuous reluctance. When on duty in the bridge she was crisp, efficient, and knowledgeable. She checked her navigation constantly by having us drop out of super-light velocity at random times so that she could take an observation of the stars. It took only a few seconds, then we accelerated back into super-light again.

At night, in bed, she tried to talk me out of entering the Zeta system.

"It's suicide, Orion! They'll blast us before we have a chance to blink our eyes. The system must have automated defense bases all around it, belts of them orbiting the star. They'll be programmed to shoot the instant any unauthorized vessel pops out of super-light within range of their weapons."

"We'll send message capsules ahead," I repeated each time she brought up the argument. "We'll tell them exactly when and where we'll appear."

"Great! Then they'll know exactly where and when to shoot!"

"Our mission is a peaceful one," I said. "Surely the Hegemony can understand that one scout won't be a threat to their capital."

Frede huffed at me. "No, they'll see it as an opportunity for target practice."

Every night we came to the same deadlock. And every night I would end the matter by saying, "Lieutenant, the time for argument is finished. As your commanding officer, I order this discussion closed."

Frede would grumble and give it up. Until the next night. We made love infrequently during that flight to Prime; it was difficult to work up any ardor when each of us was convinced that the other was being pigheaded.

And then, the night before we were scheduled to start sending out the message capsules, Frede told me what was really bothering her.

"You call out to Anya in your sleep,

you know."

She was undressing. I did not feel at all sleepy. I did not answer her.

"That's the reason you want to go to Prime, isn't it?" Frede asked me. "She's there."

"Yes," I admitted.

"You're willing to get us all killed, for her?"

"She can stop the war," I said.

"Dogshit she can. Nobody can stop this war. It's going to go on forever."

"Is that what you want?"

"It's the reason I'm alive, Orion. All of us mutts. Stop the war and they freeze us."

"Continue the war and you'll be killed, sooner or later."

She ran a hand through her short-cropped hair. "Some choice, huh?"

"Maybe I can change things," I said, not really believing it myself, but wanting to give her some glimmer of hope.

She smiled weakly at me. "You asked me what I wanted. I want you, Orion. I want to get off this damned dogshit of a life and run away and find some happy little world that the Commonwealth and the Hegemony have never even heard of, and live a normal life there. With you."

The look on her face. As if she expected to be hit. Cringing, almost. She had revealed herself to me knowing that there was nothing she could expect except to be hurt.

As gently as I could I took her in my arms and held her for a long, long silent time.

At last she disengaged a little and smiled up at me again. There were tears in her eyes. "Some soldier, huh? I ought to be popped back into a freezer and given a long course in discipline and loyalty, right?"

"You ought to be allowed to live a normal life," I murmured.

"Yeah. Right." She pushed entirely away from me and began to strip off her army-brown undershirt. "Well, a normal life for us mutts is to follow orders, fight the enemy when we're awake, train for the next fight when we're in the freezer. Right?"

There was nothing that I could think of to say. As I watched, Frede stripped naked, stamped barefoot to the bunk and pulled down the top sheet.

"Well, I know my rights. I may be just a mutt, but I know my rights as a soldier. Get your gorgeous ass into bed, sir. It's time for you to do your fucking duty."

I made myself smile and say, "Aye-aye, sir."

Next day the tension on the bridge was thick enough to chew on. We slowed out of super-light one last time and Frede used the few seconds to snap panoramic views of the star fields around us. Once safely back in super-light she checked our position, made a slight course correction, and announced in a loud, brittle voice:

"Next stop, Zeta system."

The others on the bridge said nothing, but I could see their bodies stiffen and they avoided looking me in the eye.

I ordered the message capsules sent out, one every four hours for the next twenty-four. Thirty hours from now we would slow to relativistic speed at the edge of the Zeta system. We would either be greeted warily as ambassadors under a flag of truce or blown out of existence in a few nanoseconds.

It was a tense thirty hours. The Hegemony could deduce the direction from which we were approaching Zeta by backtracking the message capsules as they appeared in normal space. Thus they could focus their defense on the area where we would appear. What they could not do was to send us a message in return. I would have given a lot to hear either that they were willing to accept us as ambassadors or that they were waiting to destroy us if we should enter the Zeta system. It would have saved thirty hours' sweat.

"Light-speed in one minute," the navigation computer announced.

"Still plenty of time to turn around, sir," said Emon, the weapons officer. I glared at him, then saw he was trying to grin at me. It was supposed to be a joke.

"Forty-five seconds."

"I wonder what it's like to be a plasma cloud," Magro, the comm officer muttered, loud enough for everyone on the bridge to hear.

"Peaceful," Frede said.

"Mind-expanding."

"Just plain expanding."

"Thirty seconds."

I said, "Just in case you didn't know, I've enjoyed serving with you."

"We know, sir!"

"A mutt gets to sense when his commander's having a good time."

"You've got to be born to it. Sir."

"Ten seconds."

I glanced at Frede at the instant she happened to look at me. No words. Not even a smile. But we understood one another.

"Light-speed," said the computer.

All the screens on the bridge lit up to show a sky full of dazzling stars. And Hegemony dreadnoughts.

"COMMONWEALTH SHIP, YOU WILL ESTABLISH CIRCULAR ORBIT AT FIFTY ASTRONOMICAL UNITS FROM STAR ZETA AND STAND BY FOR BOARDING AND INSPECTION."

They were not going to shoot first.

I punched the communications keyboard and answered, "We will comply with your instructions."

They sent Skorpis warriors aboard to inspect us and disarm our ship's weapon systems. Then they confiscated all our sidearms and assault rifles. I accompanied the boarding team as they went through the *Apollo*. They were very thorough in their search for weapons, but equally careful not to tear up the ship.

"You will wait aboard your ship until further orders," the chief of the Skorpis boarding party told me, after his team had finished.

We were standing at the main airlock hatch. He towered over me by a full head, his shoulders so wide that he would have to go through the hatch sideways. I hoped he would remember to duck his head. As it was, his furry skull was bare millimeters from the metal ribbing of our overhead.

"We are Commonwealth military personnel on a diplomatic mission," I replied to him. "We will accept instructions from your superiors, not orders."

His lip curled in what might have been the Skorpis equivalent of a smile. "Instructions, then."

With that, he turned, ducked low, and went sideways through the airlock hatch to return to his own ship.

I let out a breath of relief.

"I thought they were going to take our butter-knives," Jerron piped when I returned to the bridge.

"Makes you feel kind of naked," said Emon, "without even a pistol."

"We're here to talk, not fight," I reminded them.

"Yessir, I know. But I still feel naked."

For two days we waited inside our ship as it swung in orbit out at the far end of the Zeta system. Prime, the capital planet, was far closer to the star Zeta. We were out in the cold and dark, the closest planet a gas giant almost as large as the one at Jilbert.

I wondered if the Old Ones inhabited that huge world, as they did Jilbert's gas giant. But when I tried to probe for them with my mind I received only silence.

With little else to do, I called up the ship's information system for data about the gas giant worlds of the Zeta system. There were three of them. No native forms of life had been found on any of them, as far as the ship's computer knew. Only the largest, the one closest to the star, bore an ocean of liquid water. The others were too cold for water to remain liquid, even under the pressure of their heavy gravity fields.

I studied the information about Prime instead, looking for all the details I could find about that gray, grim, rainswept world.

Then we received a message that we would be boarded again. I told the crew to spruce up and look snappy for the Skorpis. They complained loudly, their fears of instant annihilation long since forgotten, and grudgingly put on their best uniforms.

"Trying to impress the Skorpis is like trying to train a cat to fetch a stick," one of the troopers grumbled.

This time, however, it was a human team that came through our airlock. Two male soldiers carrying sidearms and a young woman bearing a red sash across her tunic.

"I am Nella, of the Hegemony diplomatic corps. I am instructed by my superiors to bring your representative to Prime."

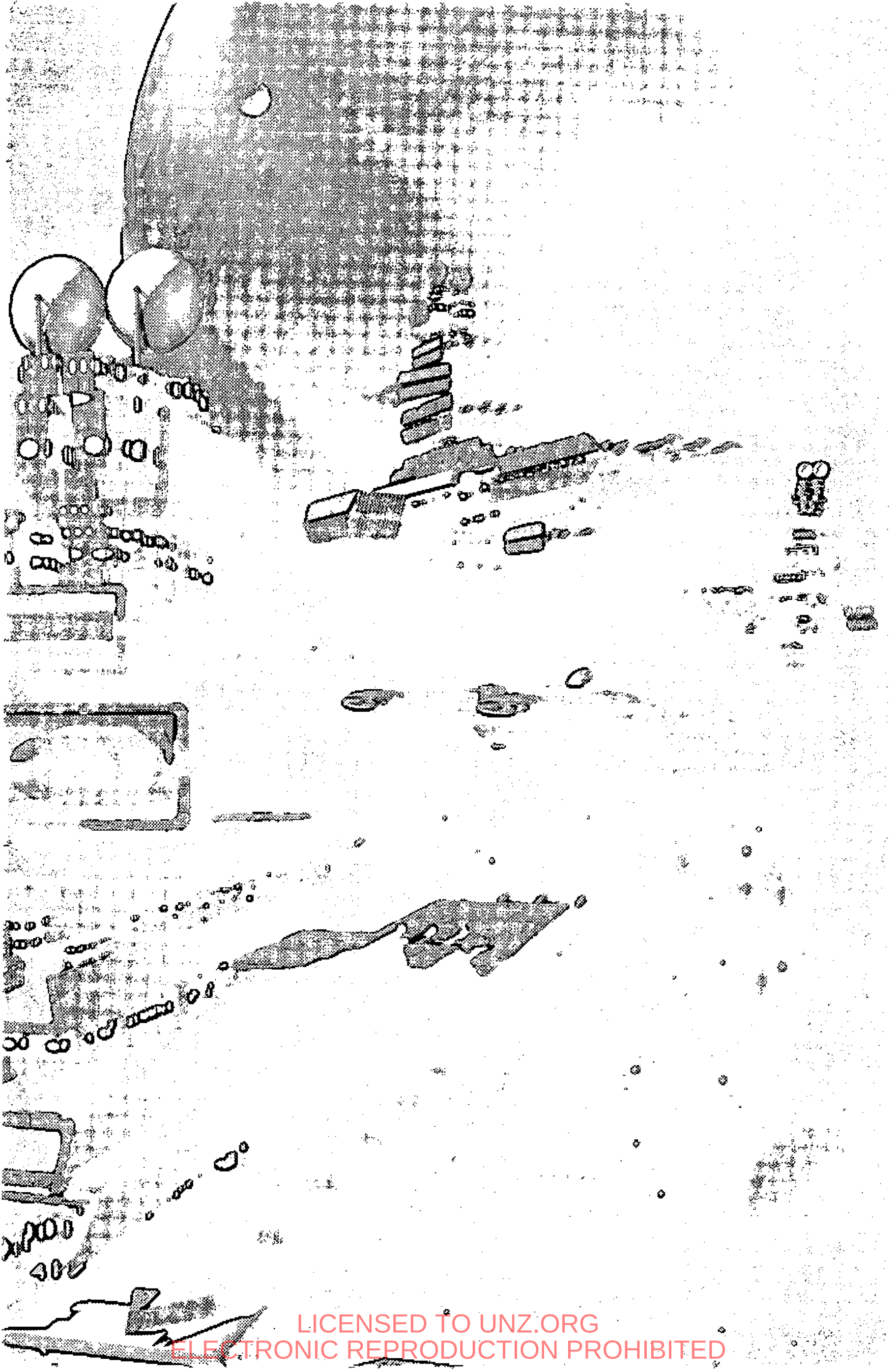
I introduced myself and told her that I was the representative. She looked me over and I did the same to her. Nella was small, almost tiny, and seemed very young. I thought she must have been a very junior member of the diplomatic corps, an expendable, sent to fetch me by superiors who were still worried that I might be some sort of Commonwealth trick.

I noticed that Frede was studying her even more intently than I. Only then did I realize that Nella was rather pretty, youthfully charming.

"It will be my pleasure to escort you to the capital," Nella said, with a sparkling smile.

Turning to Frede, I said, "Lieutenant, you're in command while I'm gone."

"Yessir," she said, snapping a salute.



Startled by her formality, I returned Frede's salute, then told her, "Take care of the ship. And yourself."

Her face a frozen mask, Frede only repeated, "Yessir."

The capital city on Prime was a stunning surprise to me. True, most of its buildings were made of heavy gray stone quarried from the nearby cliffs, but everything else the ship's computer had shown me seemed to be a carefully edited pack of lies—or at least, a terribly slanted view of Prime.

The sky was thick with clouds, but they scudded past on a warm wind from the sea with plenty of blue sky showing between them and sunshine beaming down on the gray old stones of the city. The avenues were thronged with people, vehicles skimming lightly over the guideways, pedestrians strolling past shop fronts displaying brightly-colored fashions and all sorts of wares from hundreds of worlds.

There were Skorpis warriors in sight, but not in battle dress. They were easy to spot, their heads bobbing along well above the rest of the crowd. They seemed to be on leave, not on duty. Plenty of other aliens, too, some of them fully encased in spacesuits to protect themselves from an environment that was hostile to them.

The city seemed happy, busy, engrossed in the everyday matters of shopping, dining, meeting people, finding romance, earning a living, enjoying life. Not at all the grimly forbidding view painted by the Commonwealth's computer. I was shocked by the contrast. And then I realized that the city did not seem concerned at all about the war. If these people knew that their soldiers and allies were fighting and bleeding and dying for them, they certainly did not show it. Just a few hundred kilometers above their heads orbited dreadnoughts and battle stations ready to blast an invader into subatomic particles. But down here on the busy avenues life went along in sunny unconcern.

I saw all this from inside a luxurious limousine. Nella had brought me straight to the capital's spaceport, and then we had ridden in this spacious, well-appointed skimmer into the heart of the city. I got the impression that she was enjoying the ride tremendously; she did not often get to ride in such elegance.

We drove through the crowded shopping district, then past long rows of buildings that looked almost like ancient temples. The traffic here was lighter.

"Government offices," Nella replied when I asked her what they were. She pointed to one as we swept past, "I usually work in there, back in the rear, you can't see it from here. I don't have a window, anyway."

The street climbed up a steep hill.

"That's the capitol, up in the old castle," Nella told me. "That's where we're going."

A full honor guard of Skorpis warriors lined the steps as we disembarked from the skimmer and entered the capitol building. I saw they were fully armed. They fell in step behind us as Nella led me through a large and beautifully furnished entry hall toward a narrower corridor that ended in a metal door.

It was an elevator. The doors slid open to reveal two human soldiers, wearing sidearms only. Nella ushered me in, then came in behind me. The doors shut, leaving the Skorpis detachment outside.

We rode down, not up. "Medical exams," Nella murmured when the elevator stopped. "We must make certain that you're not carrying any disease organisms."

Or bombs, I added silently. The examination was swift and almost completely automated. I was walked through four different scanning archways; then a white-coated human doctor watched as still-another automated archway recorded my full-body scan.

"Completely normal," the physician pronounced, running a finger across the readout display screen. "And extremely healthy."

Satisfied that I was not a walking bomb, Nella and the two human soldiers led me back to the elevator. Again, we rode down, deeper into the bedrock upon which the city was built.

At last I was led to a massive blast-proof parasteel door.

"I'll have to leave you here," Nella said, almost apologetic. "When the doors open, step right through. The director is waiting for you on the other side."

She hurried away, back to the elevator. I stood in front of the heavy doors, feeling a little silly to be standing there all alone.

Then the doors swung open as silently as the lid of a jewel box. I walked into a dimly lit room. I saw a long, highly polished table that seemed to be made of granite or perhaps onyx. High-backed padded chairs lined both sides of the table. All of them empty.

The doors swung shut behind me, casting the room into even gloomier shadows.

There was someone sitting at the far end of the table, at its head. Alone, barely discernible in the dim lighting. I realized that I was bathed in light from a lamp in the ceiling high above, bathed in a cone of light while whoever it was at the end of the table hid in the shadows.

I stepped forward and the cone of light moved with me. Very well, I thought, I'll go to the head of the table and see who's there.

But I stopped before I had taken two steps. My eyes adjusted to the dimness and I recognized the figure watching me from the head of the table.

My knees sagged beneath me.

Anya!

CHAPTER 24

She did not smile at me. She did not give the slightest inkling that she knew who I was. She watched me with those incredibly beautiful gray eyes as I slowly, hesitantly, came toward her. Anya was wearing a simple cream-colored sleeveless dress, her hair was pulled back tightly, highlighting the sculptured plane of her cheekbones, the delicate yet strong curve of the jaw.

As I approached her, slowly, like a penitent making his awestruck way to a shrine, her face began to change. Her skin wrinkled, lost its youthful luster, began to look like faded parchment. Her hair turned gray, then white and lifeless, her hands became knobby claws, spotted with age.

"I am dying, Orion." Her voice was the croak of a feeble old crone.

I rushed to her side. She barely had the strength to hold up her head. I reached out to take her in my arms, but found myself frozen in place, immobile, helpless.

"Aten and the others have sent you," she said, her voice was a weak, rasping wheeze. "They want to finish the work they began long ages ago."

I could not even speak. I strained to break free, to reach her.

"Don't struggle, Orion. You are in a stasis field and you will remain there until I determine what to do with you."

But I'm not your enemy! I wanted to tell her.

Her withered face cracked into a sad smile. "My poor Orion. Of course you're not my enemy. Not consciously. Not willingly. But you are Aten's creature and you will do his bidding whether you want to or not. You have no choice. And I have no choice except to protect myself as best as I can and fight against the others with the last atom of my fading strength."

You can't be dying, I said silently.

"I am dying, Orion. It takes a long time, but the strength ebbs away a little more each day, each hour. It took an enormous effort for me to appear young, the way you once knew me, when you first entered this chamber. Now you see me as I am, with very little time left."

No, I thundered silently. No!

Anya shook her head painfully. "I don't want it to end this way, my beloved. I don't want it to end at all. But I am trapped. Aten has won."

"Never!" I roared. And with all the willpower in me, with all my anger against the smug self-styled Creators, with all the rage against my being used as a witless pawn in this battle across the millennia, with all the bloodlust that had been built into me so that I would be a useful hunter, assassin, murderer—I broke free.

I tapped the energy of the stars, the energy of the continuum. Just as Aten and the others had sent me across space-time I reached out for Anya and leaped through the continuum, through the endless cold of absolute nothingness, across eons of time and parsecs of space.

And found the two of us standing in a forest. Tall trees dappling the warm high sun, colorful birds flitting through the foliage, squirrels scampering, insects buzzing.

"Orion!" Anya gasped. "How could you. . . ?"

Then she looked down at her hands and saw that she was young and strong again. I pulled her to me and kissed her tenderly.

"Do you know where we are?" I asked her.

She took in the entire world in a single glance. "On Earth," she said. "In the forest of Paradise."

The wide woodland that someday

would become the Sahara Desert. We had lived here with a Neolithic band, happy and content once we had escaped Set and his reptilian invaders.

"You remember that we thought about staying here forever," I said.

"Yes," Anya replied. But she pulled slightly away from my arms. "Yet we decided that we could not enjoy Paradise when there were so many conflicts in the continuum that had to be resolved."

"Perhaps we were wrong," I said. "Why can't we stay here and let the continuum solve its problems without us?"

She fixed me with those lustrous eyes of hers. "Because then Aten would solve the continuum's problems. And he would take all this away from us. He hates you, Orion. He fears you. And he hates me for loving you."

Aten fears me? That was a new concept for me to consider. "My powers are still growing," I said. "Perhaps I could protect us, protect this whole segment of the continuum. We could be safe here."

"Not from Aten. He's robbed me of my power. He is deliberately killing me, and all the other Creators who sided with me."

"But here you're strong and young."

"Yes," she admitted, smiling sadly, "but that's your doing, Orion, not mine. I can't change form anymore; I've lost the power. Aten has stolen it from me. He wants me dead. Me, and all the other Creators who oppose him."

"Why? What's the reason for all this hatred and killing? Why the war? What's this ultimate crisis?"

She almost laughed. "Orion, you're like a little boy, asking so many questions. They're not easily answered."

I gestured toward a sunny glade where a swift stream burbled over rocks, hardly a few meters from where we stood. "Very well. Let's go sit in the warmth of the Sun and watch the deer come down to the stream and drink. And you can begin to explain it all to me."

"I'm not sure that I can," Anya said, but she walked along with me toward the grassy glade.

"Then tell me as much as my limited mind can understand," I coaxed her.

"Your mind is not as limited as Aten thinks," she told me. "He would be shocked to know that you can translate yourself across the continuum, and carry me along with you. And rejuvenate me, too."

"If we go back to Prime and the era of the war, will you remain as youthful as you are now?"

"No," she said ruefully. "I will be a dying old hag there, unless I exert almost all my failing strength to appear young for a few moments."

"How did Aten do this to you?"

We had stepped out of the shade of the trees, into the welcoming sunlight. Walking to the edge of the stream, we sat on the soft grass, our backs against a big Sun-warmed boulder.

"This war between the Commonwealth and the Hegemony," Anya said, "is really a continuation of the conflict we had over Troy."

"But why—"

She hushed me with a finger on my lips. And began to explain as much as she could.

The human race had expanded through the Solar System and out to the stars, not as a single unified species, but as a pack of squabbling, contending tribes. Humankind had not overcome its tribal animosities merely because we had achieved interstellar flight. The Creators had built that aggressive nature into us, and no amount of technology could remove it. Indeed, the more sophisticated our technology became, the more dangerous our weaponry. We could blast whole planets clean of all life. Now we were ready to shatter stars.

We had found other intelligent species among the stars. Some were far below us in technological and cultural development: cave dwellers or simple herders and pastoralists. By and large these were left alone by the expanding human species; they had nothing to offer us, neither trade nor knowledge nor competition. Scientists studied them, although now and again unscrupulous humans colonized their worlds and despoiled them.

We also found other species that were far beyond us and, like the Old Ones, wished to have nothing to do with humankind or its ilk. But there were several intelligent species among the stars, such as the Tsihn and the Skorpis, who were close to our own level of knowledge and power. With these we could trade. And fight.

Inevitably, the humans who colonized the stars polarized themselves into two competing groups: the Hegemony and the Commonwealth. Inevitably, they sought allies among the aliens of our own level. Inevitably, they went to war.

"Inevitably?" I asked Anya. "Aten told me that this war is actually a struggle to decide how the Creators will deal with the ultimate crisis."

She bowed her head in acknowledgement. "I hadn't realized he had revealed that much to you."

"Have *all* of humankind's wars been caused by the Creators?" I asked.

"No, not all of them. The human species is ferocious enough to start its own wars, without our instigation."

"But what is this ultimate crisis?" I wanted to know. "Why do we have to kill billions of people and destroy whole planets? Why is the Commonwealth preparing to use a weapon that can blow away a star?"

Her eyes blazed. "They're ready to use it? How do you know . . . ?"

"The Old Ones."

"Aten has made contact with the Old Ones?" Anya looked frightened.

"No, they refuse to speak with either the Commonwealth or the Hegemony."

"Then how—"

"They spoke with me. They told me to warn both the Commonwealth and the Hegemony that they will not allow a star-destroying weapon to be used. They said they would eliminate all of us—all of humankind and all our allies—if we tried to destroy a star."

Anya leaned back against the boulder. "They spoke to you?" She seemed unable to believe it.

I assured her that they did and gave

her every detail of my contacts with the Old Ones. She probed into my mind and confirmed that it was all true.

"Then the Hegemony is lost," she said at last. "And me with it. Aten will win. We were hoping to develop the star-destroyer ourselves. It was our last chance, a desperation weapon that we hoped would be so terrible it would force the Commonwealth to accept a truce."

With a shake of my head, I repeated, "The Old Ones won't permit it. They'll wipe out all of us instead."

Anya's eyes looked old again, weary and defeated. "Then you'd better bring me back to Prime. I must tell the other Creators before they decide to go ahead with the weapon."

"Tell me first how Aten is killing you. How is it possible?"

She shook her head again, utterly weary. "It's a disease, Orion, a biological weapon that feeds on my metabolism. Aten developed it and planted it in all the Creators."

"All of them?"

"Every one of us, long eons ago. The microbe lies dormant for ages, then slowly awakes and becomes active. Little by little, it saps your strength, slows your powers. Gradually its effects accelerate, until at last you wither and age and finally succumb."

"But Zeus and Hera and the others—they didn't show any signs of aging."

A wan smile. "That's because Aten is keeping them alive. As long as they stay with him, support his side of this war, he keeps them healthy."

"And there's nothing you can do? No cure? No way to restore yourself?"

"Don't you think we've tried to find a cure? The organism mutates even as we study it; its basic genetic structure changes randomly. Aten spent millennia developing this disease. He experimented with hundreds of generations of humans to perfect it. Half the plagues in human history were his experiments."

"Yet he can protect the Creators who accept his domination."

"Apparently, although I wonder if he doesn't plan to kill them, too, when he no longer needs them."

"He always wanted to be the only god," I muttered.

Anya seemed to grow weaker with the exertion of admitting her helplessness. Yet I could not believe that she and the other Creators could not overcome Aten's treachery.

"If he can protect some of the Creators," I wondered aloud, "why can't you and the others find the protective agent for yourselves?"

"Because it is keyed to Aten himself," she answered. "He reaches through spacetime to alter the microbe whenever we attempt to counteract it. We develop a vaccine and he changes the microbe to be immune to it. We move through spacetime to annihilate the microbe, and he moves through spacetime to revive it. The game is endless and deadly."

"And each time any of you translates across spacetime it unravels the fabric of the continuum a little more," I said, remembering what the Old Ones had told me.

"Yes," Anya agreed grimly. "Already

the continuum is so disturbed that we can no longer accurately trace the various spacetime tracks. We can't probe the cosmos anymore, Orion! We're losing our ability to foresee the results of our actions. Chaos is crashing down upon us all. Absolute chaos!"

She was trembling with fear. I took her in my arms and held her while the warm Sun of Paradise swung westerly and began to set, turning the sky aflame with red and violet clouds. I watched the deer and smaller animals come to the stream for their evening drink while Anya remained huddled in my arms, as if asleep.

As the world grew dark, though, she lifted up her head and looked into my eyes.

"We must go back, Orion," she said, tearfully. "I must tell the others that we cannot develop the star-killer. I must get them to see that we have lost the war."

"And Aten has won?"

"Yes."

I shook my head. "Not while I live." ■

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The Pure Cold Light, Gregory Frost, Avon, $4.99, 242 pp.
(ISBN: 0-380-76774-0).
Pictures at 11, Norman Spinrad, Bantam, $12.95, 456 pp.
(ISBN: 0-553-37384-6).
Primary Inversion, Catherine Asaro, TOR, $21.95, 317 pp.
(ISBN: 0-312-85764-0).
The Dragon, the Earl, and the Troll, Gordon R. Dickson, Ace, $21.95,
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(ISBN: 0-06-105206-X).
Asimov's Chronology of Science & Discovery, Isaac Asimov,
HarperCollins, $35, 791 pp. (ISBN: 0-06-270113-4).

There is a strong bias in the more liberal sectors of American society. Intellectuals of many sorts, on campus and off, share a belief that the enemy of progress and freedom and human fulfillment is Big Business or Big Government or both. To some extent, I share this belief myself, *which does not make it any less a bias.*

For many years, the conservative equivalent has been the belief that the foe of progress and prosperity and manifest destiny is pinko liberal bleeding-heart socialist comsymps. To some extent, I share this belief myself, *which does not make it any less a bias.*

Both biases show up in science fiction, often in the form of the supremely evil foe an author's Noble Heroes must overcome. Either bias, so used, irritates me, for life is rarely so monolithic and while exaggeration is a legitimate tool for a writer, it loses potency when it is overdone. The villains become strawmen, and the stories that rely on them become tritely predictable.

This is the problem with Gregory Frost's **The Pure Cold Light,** in whose first few pages a ground-down corporate peon discovers something he shouldn't and is promptly assassinated. Enterprising investigative reporter Thomasina Lyell discovers a corporate-governmental plot to load fast food with pacifying drugs. Her boss kills the story, but she has also stumbled on a strange fellow, his head half-covered with a device supposedly filling in for brain functions lost to stroke or injury. A bit of research identifies the man as Angel Rueda, who vanished some time back when the drug Orbitol finished him off.

Orbitol is funny stuff. It gives one visions of another world and gradually turns its users' bodies transparent and mushy. Eventually only one last bit is left—like the Cheshire cat's smile—and then that too is gone, poof, and the user is no more. There are strong signs that Orbitol is a corporate plot to vanish away the teeming poor and homeless.

But here's Angel, back again, and the corporate goon squads are hunting for aliens in the undercity. It doesn't take long for the reader to catch on: something is amiss with the corporate plot, Big Business is about to get some sort of comeuppance, and the only question is the nature of the scenery on Denouement Road.

Frost is an inventive fellow, so the scenery is worth a visit. But one does come away with the sense that Denouement Road is paved with yellow bricks and the strawman would have gained considerable depth, verisimilitude, and believability if Frost had given him a heart.

Norman Spinrad is a provocative, innovative, gutsy, astonishing, compelling, and satisfying writer. He's excellent. He's award-winning. He's. . . . Add your own adjectives. The list is long—long enough to make a new book with his name on it an immediate must-read even if you don't think he's perfect.

His latest is a masterpiece of caustic satire, **Pictures at 11,** and once you pick it up it'll be a while before you want to put it down again. The scene is KLAX, a fringe-market Los Angeles TV station, living off the wire, its staff a tired old manager, a camera crew, and the trio who sits behind the prettied-up plywood news desk. Meet Heather Blake, a weather girl who really wants to be a director, would settle for actress, and isn't nearly the bimbo she pretends. Here's Carl Mendoza, sportcaster, ex-Nam, ex-spook (briefly), ex-ball player. Here's Toby Inman, once a Georgia up-and-comer who leaped at the chance to anchor a gen-yoo-ine LA news desk. Complacency, fatigue, and frustration, going on the air one more time as six pee em rolls over the top and BOOM!

The door slams open, and the Green Army Commandos take over the station. Their chairperson is Horst Klingerman. Their Minister of Information is the lovely Kelly Jordan. The troops are survivors of a dozen terrorist groups, and the Green Army Commandos are themselves "noble green warriors of Gaia," ecoterrorists sworn to mend humanity's foolish ways, beginning right there in LA, where a referendum is scheduled two days hence to decide whether to build offshore a chain of floating nuclear desalination plants to end the drought. They will hold KLAX until the plants are KOed; if the plant plan wins, or if LA's Finest storm the station, well, that's what the Uzis and the vests loaded with plastique and the boxes of explosives now tucked into every corner of the building are for. Boom-boom time. Bye-Bye Heather, Carl, and Toby.

But first they have to go on the air to deliver their demands. The news crew, troupers all—Hey, this is show biz, don't ya know—go along with it, covering their own kidnapping, even offering suggestions on how to improve the terrorists' image. And the ratings jump.

The station is surrounded by the troops in blue, but thanks to the miracle of television, the Green Army Commandos actually have some success in getting their message—it's time to take direct action to stop destroying the planet—across to the people. The LAPD is replaced by the FBI. The referendum thumbs-downs the floating nukes. The terrorists, now faced with the problem of getting out alive, escalate their demands. The CIA takes over. Show biz forces the invention of the Green Army Commando Show, anchored by the captives. Big-time agents call, wanting a piece of the action. *Und so weiter,* as Spinrad has been fond of saying in other pages.

Where is the line between image and reality? Between reporting news and making news? These are questions of some concern to those who live in and around show biz, as well as to those who see a certain confusion between image and reality, making and reporting, seeping from show biz into the rest of the world. Spinrad insists that confusion has taken over both politics and journalism, and he is not the first I have heard saying as much. He might have targeted a few other aspects of modern life as well, but surely it was a better choice to keep his focus sharp, skewering on his biting wit a restricted subset of humanity.

When I began to see where Spinrad was going, I hefted *Pictures at 11* in one hand and wondered how he could possibly run such a small joke—for that is what it is, really—for so many pages. But every time I felt that he had about run out of steam, he proved me wrong by finding another twist for the situation. He took his wit again and again back to the hone and returned with it as sharp as ever. He therefore kept my interest keen, and in the end I had to admire what he had done quite wholeheartedly.

Catherine Asaro is a physicist and the editor of *Mindsparks,* a small magazine focusing on the science in SF. Now she's also a novelist, and her first novel is a page-turner loaded with passion and intrigue. It is flawed largely by excessive—and surprising, for a physicist author—reliance on fantasy gimmicks such as telepathy.

Primary Inversion's heroine is Sauscony Valdoria. She is a Rhon of the Skolian Empire, meaning that she is a member of the only family that can operate the star-spanning telepathic web that gives the Skolians any edge at all over the evil Traders who so lack all empathy that they enslave everyone they can and torture projective empaths such as Sauscony to fill their own inner voids with the thrills of agony. She knows, for she was once kidnapped by a Trader Aristo and used as a "provider" of such thrills.

It takes a while for Asaro to reveal this, for as the tale opens Sauscony and her fellow computer-enhanced space warriors, or Jagernauts, are visiting the world of Delos for a bit of R&R. They stroll and muse and chat. In due time an Aristo appears and makes what seems an all too normal pass at Sauscony. She detects none of the arrogance and evil that is so typical of Aristos. Intrigued despite herself, she investigates, even going so far as to break into the Aristo's fortress mansion. What she finds. . . .

Both Rhons and Aristos are the products of genetic engineering. They are total antitheses, totally incompatible, absolutely and unalterably opposed, innately defined enemies forever. Yet *this* Aristo, Jaibriol, is something different. He is the heir to the Trader Empire, bred by his father and grandfather to have the genes and talents of a Rhon! Ultimate weapon! Ultimate catastrophe for Skolia! And worse, far worse, for Sauscony, for as soon as their minds touch they recognize in each other their soulmates.

How can that be? For one thing, Jaibriol has been so shielded from the truth of the Trader Empire that he refuses to believe the evils Sauscony knows are there. Yet here is his assignment, to go to a world whose populace is fighting off the Trader yoke and oversee a final solution. As soon as she hears this, Sauscony knows what that solution must be, and she hies off to do what she can to save that world's people.

After a thrilling space battle, she partially succeeds. Then it is home to Skolia, where her half brother rules and is considering whether she should be his heir. She spots Jaibriol on the news, giving speeches but looking drugged, but she knows nothing more of her catastrophic soulmate until her brother informs her that he has been captured, zipping across space in a single-seat spaceship. Interrogation has been fruitless; perhaps she will be more successful.

What is a poor girl to do? What is Jaibriol up to? Is he soulmate or foe? What does she want? What are her options? That I'll leave to you, folks, adding only that *Primary Inversion* has plenty of momentum, plenty of action, and tubs full of suds.

The series Gordon R. Dickson began when he returned to his 1976 story, *The Dragon and the George,* has now reached its fourth added volume. **The Dragon, the Earl, and the Troll** continues the tale of James Eckert who, magicked into a rough parallel of Earth's fourteenth century, found himself in the body of a dragon, fighting for the life of his sweetheart, Angie. He won, discovered that he was not only a part-time dragon but also a low-level wizard, claimed that he had been a baron back home, and got handed a baronetcy, a small castle, a staff, and a continuing series of magical problems involving sea serpents, giants, knights errant, and magical overdrafts, not to mention snotty dragons.

The current volume sends Jim and Angie off to the local Earl's twelve-day Christmas party with the assignment to find out how the forces of evil plan to mess things up. Jim promptly discovers a troll in the basement who is upset that another troll is invading his territory in disguise among the guests, a troll army in the woods, awaiting the propitious moment to attack the castle, and a tribe of dragons who have decided they want to come to the party too. How Jim manages to solve all the problems roughly simultaneously, while also rising in wizardly rank and protecting himself from the forces of wizardly conservatism, is the tale.

It's much lighter than Dickson's more seriously intended Childe Cycle novels, and it's both predictable and as gabby as if Dickson were still being paid by the word. But it's fun.

Just as predictable (despite a supercilious robot whose frequent asides insist, "Nyah, nyah, you *think* you know what's going on, but you're *wrong!* So there!") but much less gabby is Alan Dean Foster's **Greenthieves.** The setting is Juarez-El Paso spaceport, through which a certain company's exceedingly valuable custom-designed pharmaceuticals are shipped. While awaiting a shuttle, the drugs are kept in a storage shed set amongst decorative shrubbery. The shed is burgle-proof, but it has been burgled anyway, and in a way that left no clues.

Enter plug-ugly Broderick Manz, insurance adjuster extraordinaire, accompanied by the other-worldly Vyra (who has a *vyry* strong effect on men) and his two robots, the snotty Minder, a ball that floats over his shoulder, and the humaniform Moses, whose programming has gone just a bit awry (he wants Vyra to help him with a spot of research into certain aspects of mammalian behavior). Their job is to solve the crime despite its apparent impossibility made more baffling than ever when the shed is burgled once more right before their vyry eyes. This time, however, there is a clue—a round hole in the shed's floor.

If you remember Sherlock Holmes's famous dictum about eliminating the impossible, and combine that with the book's title, the only remaining question is how long it will take Our Heroes to figure out what is going on.

Since they take quite awhile the reader cannot help but feel annoyed at their stupidity. The tale would have been much more satisfying as a short story.

The ongoing saga of the Discworld adds a charmer with Terry Pratchett's **Soul Music.** Once again, Death hies off in search of meaning and forgetfulness (or vice versa), and Susan, the daughter of his adopted daughter, must step into his place. She does it well, for she has inherited the necessary talents (genes? shmenes! the Discworld is magic!). Meanwhile, Imp, a prize-winning harpist from the sticks, has come to the city of Ankh-Morpork in search of fame, fortune, and maybe even groupies. What he finds is a musician's guild that seems much more interested in extorting money from would-be members than in letting them play. He also meets a dwarf horn-player, Glod, and a troll, Lias, who plays rocks. They think he looks rather elvish even though his name, Imp y Celyn, translates as Bud y Holly.

And when Lias sits on Imp's harp, there's nothing to do but find a quaint little shop full of mysterious musical instruments, one of which looks a whole lot like an electric guitar, even though it lacks a cord and amp. Imp touches it, it sings to him, and it's love at first sight.

And his buddies still think he looks elvish.

Their first gigs are in a night-spot so rough guild members won't play there. They are, of course, a smash hit, and "music with rocks in" is off and running. So are the riots, and when one is scheduled to kill Imp, he does not drop. The music fills him, becomes his soul, is all; when this anomaly attracts Susan's attention, she falls for him and becomes his protector against the thugs sent by the musicians' guild to punish him for not joining.

Soon there are imitators, promoters, rock festivals, tee shirts, and all the rest of the paraphernalia of the modern real-world music scene. Pratchett is having grand fun poking fun, and the reader cannot help but enjoy going along for the ride.

* * *

In general, I don't bother with TV spin-offs such as the Star Trek novels. The few I've looked at have seemed pretty straightforward adventure designed to appeal to a body of preexisting fans, a bit thin for someone who likes, say, Norman Spinrad or Michael Bishop.

But every so often I do like to challenge my prejudices. I therefore picked up John Vornholt's **Antimatter,** No. 8 in the Deep Space Nine series. For those unfamiliar with the background, DS9 is a space station in orbit around Bajor, a world that suffered great decline under the boot of cruel oppressors, the Cardassians, before the Federation showed up, liberated them, and occupied the station. Now Bajor is recovering, and one of its shipyards is building a starship under contract to the Federation. The ship is obsolete by Federation standards, but the Federation wishes to help Bajor rebuild its industry and get back on its feet.

Unfortunately, there are those who see the Federation as little better than past oppressors. When DS9 commander Benjamin Sisko and his Bajoran aide Kira Nerys are surveying the nearly finished ship, someone tries to kill them. Shortly after, just as the shipment of antimatter fuel for the ship is arriving in the system, a mixed force of renegade Klingons, pirates, and Bajoran revolutionaries steals the shipment, defeating a pair of Federation warships in the process, and flees through the wormhole.

Benjamin hies off in a runabout, with only two sidekicks, to defeat the raiders. Of course he succeeds despite apparently insuperable odds that include a planet full of buggy entrepreneurs. He succeeds even though he leaves his son (the Sisko kid?) behind. And at the end the cast lines up across the stage, takes a bow, and waits for the director to cry, "Next!"

Yes, it is a bit thin. Straightforward, conventional adventure designed to challenge no one. It would have been right at home in the glory days of the pulps, which may be a hint that in times to come, TV spinoff series will turn into something notable, just as did SF. Or perhaps not—surely the existence of such a parallel (not to mention the existence of TV series) speaks to the enduring appeal of conventional adventure. Not everyone wants to read Spinrad or Bishop, and even those who do don't want to read them all the time.

Isaac Asimov's **Gold** isn't. Billed as "The Final Science Fiction collection," it draws together all his previously uncollected SF stories, along with a host of fragments, most of them apparently introductions from some of the many anthologies he edited or coedited and editorials from the magazine that still bears his name.

One gets the feeling that Harper is here indulging in a bit of "necro-exploitation." I suspect Asimov himself never collected the stories here because he considered them—with justice—minor. The anthology introductions are almost without exception of interest only in the context of the anthologies to which they were attached. The editorials—well, several are interesting but most of these too are ephemerae.

The book should, however, still appeal to those who miss the Master's voice. *That* is here in ample supply, and perhaps that is enough to justify the book. Yet it still is not *Gold—Sepia* maybe.

The smell of necro wafers is less strong for the updated and illustrated new edition of **Asimov's Chronology of Science & Discovery.** Here we see Asimov in his science-popularizer mode, sketching out the history of science and discovery from 4,000,000 B.C. to the present. The updating was done by Patricia Fogarty, who comes close enough to the Master's voice to suit the book's purpose.

This is an ideal gift for a young person one wishes to encourage in the search for understanding, for a family that is always wanting to know who discovered what when, for a schoolteacher, or for a library.

BOOKS ON DISK

The seventeenth issue of *The Electronic Publishing Forum* is now available from Serendipity Systems (P. O. Box 140, San Simeon, CA 93452; $6; MS-DOS only; 5.25" or 3.5" disk). As usual, it includes a list of available disk-top publications, an interesting excerpt from a forthcoming non-SF novel, C. J. Newton's *Costa Azul,* and reviews of new digital publishing software and products. It also uses some very nice graphics, showing what digital publishing is now capable of.

There is in addition a nice academic article on "Cyberbooks and Virtual Libraries: Hypertext and Its Implications for Literature," by Ruth Nestvold, originally a May 26, 1994, address to the German American Studies Association in Tuebing, Germany. Nestvold notes that "we are not only leaving the 'late age of print' but also the late age of reading. Perhaps electronic text and hyperfiction will turn out to be nothing more than a transitional phenomenon. After all, if it is interactivity we are searching for, computer adventures [games] are interactive in a way few hyperfictions are. . . . Hypertext is . . . a new medium whose potential is only beginning to be understood. . . . But whatever effect it eventually has on literature as we know it, hypertext and the medium of the computer will not leave it unchanged."

Personally, I suspect hypertext will make itself felt most powerfully in the nonfiction area, especially for textbooks and reference books. ■

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MUAS3

Dear Mr. Schmidt,

Your editorial in the Nov. '94 issue has inspired me. Especially the part where you say "... I'm sure you'll have no trouble finding plenty more examples of 'statistics abuse,' in your own information sources." And again where you say, "And if you complain about some of them, maybe—just maybe—we'll eventually see some improvement."

In response to your inspiration I will complain about the most recent example of statistics abuse I have seen. Just coincidentally, there are several in your article.

The first is Mr. Shew's analysis of US-Japan trade. The argument Mr. Shew is debunking suggests that Japan restricts access to its markets, evidence is offered in the fact that the US imports twice as much from Japan as we export to Japan. Mr. Shew offers the argument that this is not truly a measure of trade imbalance. Japan can be expected to buy much less from the US, he suggests, because Japan has less than half the population of the US. On a per capita basis Japan buys more from the US than the US buys from Japan.

The first time I ran across this bit of sophistry was in an editorial in the *Detroit News*, a conservative newspaper. When I read it it struck me as being awfully similar to the old car dealer's line about losing "a little on every car we sell, but we make it up in volume." The suspicions this raised caused me to do a little research on the subject, and a lot of thinking.

From Mr. Shew's analysis I derived the theory that the US should run a trade deficit with every country in the world that is smaller and a surplus with every country that is larger. The first problem that I ran into at that time was the fact that there were only three countries in the world that were larger than the US in population. Of the three, China and India are economic basket cases, and the Soviet Union is history. Since China and India are hardly in a position to pick up the trade balance with the United States, we have to look to the rest of the world to seek our fortune. With approximately 3.1 billion people in the rest of the world, according to my 1993 almanac, we should enjoy a trade surplus of about 12 to 1. Yet, since all of the remaining countries are smaller than the US, we can expect to run a deficit with each of those countries individually. Please reread the car dealer quote.

Funny that Mr. Shew should compare Japan's purchases with the combined markets represented by the UK and Mexico. The UK has less than half the population of Japan, and Mexico is a third world country. And he noted that Canada buys more from the US than Japan. He neglects to mention that Canada has a population less than 1/4th Japan's, and 1/8th that of the US. By his logic, we must be exploiting the Canadians something fierce. Looking through the list of countries I notice that Japan is the only country, other than the United States, with a population of more than 100 million, that doesn't have a third world economy. The UK also has a population of less than 1/4th that of ours. Yet, at that time, had almost an even balance of trade. That implies that we are seriously taking advantage of them also.

I also have read the book *How to Lie With Statistics* many years ago. One of the techniques is to carefully select which statistics you use. Ask Mr. Shew why he only considered the fact that the average Japanese buys slightly more from the US than the average American buys from Japan. Shouldn't we look at the sales, rather than the purchases? Klahn's law of marketing, which I just invented, "When you are buying the markets are open, it's when you are selling that you find the markets closed." Japan's per capita sales to the US are four times as great as the US's per capita sales to Japan. This seems to clearly demonstrate the fact that Japan's markets are much more restricted than ours. QED.

As regards Mr. Shew's observations on marriage and divorce, I do not have the actual figures, but much of what he says seems doubtful. His statement that most divorces are the breakup of marriages that occurred in earlier years is likely true, and just as likely meaningless. The figure usually quoted is a comparison of marriages and divorces in one year, not a count of marriages that end within one year of the wedding. His figure of 1 in 8 ending in divorce sounds highly suspicious to me. Until all of the marriages from any one year have ended one way or the other, we have no idea how many will be till death do them part. If, however, he had counted the number of first marriages ending in divorce, and pointed out that many divorces involve second, and third, etc. marriages, he might lead up to something significant.

The figure for tire disposal in New Jersey is so out of line, that I would suspect a simple typo or other error. I find it hard to believe that anyone would falsify data so badly. If you're going to lie, you try to make your lie as plausible as possible. Very likely we have a simple error reported by some journalist who either never thought to check the numbers, or is intimidated by math.

The same applies to the quote on deaths among the homeless. The first time I heard this it was 45 per second, and attributed to Mitch Snyder. Even at 45 per minute the numbers are so outrageous that I would suspect a simple transposition of terms, perhaps he meant one every 45 minutes. I don't know if this figure is correct, but it is much more believable. In this case, I would not automatically assume that some journalist reported this without checking. The people I have seen quoting this seem to be trying to destroy Mr. Snyder's credibility, which leads me to suspect something more than journalistic carelessness. Just as a lie should be somewhat believable, so should the evidence for impeachment.

As to the spotted owls and wildebeest, I don't believe spotted owls are herd animals. While sampling and multiplying may have its statistical risks, it can be quite reliable when done by knowledgeable people. "Many mating pairs," on the other hand, is a meaningless term. A hundred in a square mile would impress me as many. A hundred in the whole world would not. The *New Republic* may not have a completely unbiased view on this. I wouldn't know, but I also wouldn't trust their figures.

Again, thank you for an editorial that inspired me to fire up the word processor and whip out a letter to the editor.

ROBERT W. KLAHN

Mr. Shew (indirectly) replies. . . .

Sigh. OK, let's take it from the top.

1. The Japanese government *does* restrict the access of its citizens to goods made elsewhere. Mr. Shew is not sure why that implies that the Washington government should do likewise. The cited statistic does not "debunk" this, but only indicates that the situation is not as simplistic as typically portrayed. Mr. Shew has heard complaints from foreign businessmen about the closed nature of US markets. Oddly, many of the Japanese trade barriers consist of quality standards and test specifications, or of such whimsical customs as driving on the wrong side of the road [and hence finding the steering wheel mispositioned on US-built cars. . . .] That Mr. Klahn first stumbled across the "per capita" analysis in a "conservative" newspaper is both gratifying and surprising, since Big Business is the foremost of those howling for protection from the Yellow Peril.

2. Normalizing figures *per capita* bears no similarity to the old vaudeville joke about "making it up on volume." Set up the equations and see.

3. In fact, a better normalization would be against *per capita income* of the purchasers; but since these are nearly the same for Americans and Japanese, the conclusion still holds. The aggregate 1986 [most recent year handy] GNP of Japanese workers was $2664 billions [$21,820 per capital]; that of American workers the same year was $4240 billions [$17,816]. Think of this as the money that citizens of each country have available to purchase goods, domestic and imported.

4. Mr. Shew compared purchases by citizens of Japan of goods manufactured within the US to those by citizens of the UK and Mexico because those nationalities ranked third and fourth, respectively.[1] Japan ranks as

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[1] Excuse such clumsy circumlocutions as "by citizens of . . ." and "manufactured within . . . ," but Mr. Shew wishes to disabuse the reader of the peculiar notion that products are being bought and sold by Washington and Tokyo governments, rather than by Coca Cola, Boeing, Mitsubishi, and by John and Jane Doe or Dozo. Neither socialist liberals nor nationalist conservatives seem to understand this, though classical liberals and economic conservatives do.

our number two customer. Surely, this merits *some* notice? Mexico ranks high for a third world country and Canada ranks high for a low population country for reasons that we shall leave as an exercise for the reader. [Hint: use a map.] Mr. Klahn may also be amused to note that, until the recovery of the mid to late 1980s, the US *did* run negative trade balances with all these countries as well as with Germany, France, Korea, Brazil, and many others, [Although only trade balances with yellow-skinned people seem to bother the Mr. Klahns of the country.] And, yes, many Canadians *do* believe we exploit them; but they are wrong too.

5. No, Mr. Klahn, we should not look at sales. All a producer can do is set his or her wares before the public and try to induce others through clever shouts and catchy rhymes to purchase them. Except where governments or "mafias" have intervened, *it is the buyer who makes the decision*. Foolish decisions, perhaps. Mr. Shew still does not know why anyone would purchase a Peugeot or a CD of rap music. But the word for this is "freedom." That each American and Japanese citizen purchases roughly equal quantities of each other's goods suggests that the situation may not be as simple as that portrayed by advocates of Mussolini's economic program.[2] Perhaps, Mr. Klahn believes with Benny the Moose that the *nation* is the economic unit, and not the individual purchaser.

6. Japan's sales to the US may be high because Japanese companies *make products that American citizens want to buy* and our government has not yet figured out how to abrogate the Constitution and coerce people into buying products made by large domestic campaign contributors.

As for the remaining points:

7. The meme that "half of all marriages end in divorce" has been passed around like a bad head cold. The divorce *rate* is about half the marriage *rate* in any given year, but that is not the same thing. Do the arithmetic. Check the denominators. Whether the actual failure rate of marriages is 1 in 8 or 1 in 100 is not relevant to this persistent misrepresentation. Divorce rates ought to be analyzed with the same statistical tools used to analyze mean time to failure of other complex assemblies. Weibull analysis suggests itself; but extreme value analysis may be more apropos. *It is not necessary for all units under test to fail in order to estimate the parameters of the distribution.* There are well-known techniques for handling right-tail censored life test data.

8. Mr. Klahn actually grasps the issue illustrated by the tire disposal figures, although he seems to believe it a point of contention. Newspapers too often reprint "data" without checking for reasonableness. A recent issue of *The American Statistician* cited further examples, including a cancer in [I believe] Danville, VA, where the government analyst [a computer programmer] refused the advice of a professional statistician and created a needless panic.

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[2] Look it up.

Whether the data are honest errors or deliberately falsified is unimportant in this regard. Reporters "intimidated" by math ought not report on numerical issues.

9. Regarding the Mitch Snyder quote, a) see ¶8 above, and b) it is not unusual for a passionate advocate of a cause to exaggerate the magnitude of the problem in order to mobilize public committment and increase contributions. Similar exaggerations abound in today's press on a variety of issues, but can be recalled from earlier years in the "missile gap" discovered by JFK and the innumerable communists "found" by Sen. Joseph McCarthy in various government agencies. There was no gap; there were only a few communists. But, whether the "45 per minute" *should* have been "one of every 45 minutes" [we are now making up statements that might have been made, a curious method of argument; but *allors!* . . .], does that really alter the fundamental silliness of the statement? How does anyone *know* how many die every x minutes? The problem of accurate measurement is not a trivial one, even in high precision machine shops, let alone in demographics.

10. Mr. Klahn is also correct when he says that "sampling and multiplying . . . can be quite reliable when done by knowledgeable people." See ¶12. The problem is the number of *un*-knowledgeable people engaged in what can best be called statistical malpractice. There is nothing in the training of an engineer, a biologist, a social reporter that automatically makes him or her competent to practice in this field, any more than Mr. Shew's background in mathematics and statistics qualifies him to do a root canal. The problem of amateur statisticians who nevertheless find their studies accepted and publicized dates back at least to Mosteller and Tukey's critique of the Kinsey studies in the *Journal of the American Statistical Society.* [Kinsey was a zoologist.] *The American Statistician* article mentioned above [reference not handy] proposed the licensing of statisticians as a solution.

11. The *New Republic* does have a bias. It is a liberal magazine. Its editor argues with Pat Buchanan on TV every week.

12. Multiply the average of a simple random sample by the population size and you obtain an estimate of the total for the population. For example, the average amount uncollectable in a sample of accounts receivable taken randomly from a year's worth of vouchers will, when multiplied by the total number of vouchers, yield an estimate of the entire year's amount overdue. But a sample consisting of the month of June will, when multiplied by 12, give no such reliable figure. [Mr. Shew knows of a bank which wasted valuable employee time performing just this useless exercise.] It does not matter that accounts receivable fail to flock like wildebeest.

13. As Mr. Shew understands the spotted owl situation, it was initially assumed that the creature could live only in "old growth" forest, *so only old growth sectors were surveyed.* Birds per sample acre multiplied by

total old growth acres would estimate total birds, *but only in the old growth areas.* However, the spotted owl also lives in habitats not included in the survey, including clear-cut and scrubland areas, so the total was grossly underestimated.[3] A nice parallel was the 1936 *Literary Digest* presidential telephone poll that found Alf Landon heavily favored over FDR. But a telephone poll during the Great Depression sampled only "old growth" households and so overlooked many "breeding pairs" of Democrats. . . .

OSWALD LEMPE
FOR MR. ROWLAND SHEW

The Editors, *Analog:*

The problem with Mark Rich's "To Hunt in Fields" (November), is not, I've decided, that it is inaccurate. The problem is that—intentionally or no—it is misleading.

Rich's protagonist has returned to the United States from a year in Central America, where he worked with an agricultural co-operative whose members, the story leaves no doubt, were overwhelmingly, if not necessarily exclusively, Spanish-speaking. But the Central American country where he was working, Belize, is an English-speaking country, one whose culture is rooted firmly—as well as it should be, after almost 400 years of British rule—not in Hispanic mores, but in those of Great Britain.

It is true, because of the large number of refugees from the surrounding Hispanic countries, that it would be perfectly possible for a person to do just what Rich has his protagonist doing, with the very people he describes. But to fail to point out that such a group was outside the linguistic and cultural mainstream of the host society is as misleading as it would be to write about the large, German-speaking Mennonite communities in Costa Rica without indicating that those communities are the exception, rather than the norm, in *that* country.

By failing to make this point, Rich left me—the whole time I was reading his otherwise excellent piece —asking myself: "Does this guy *know* Belize was British Honduras for almost four centuries? Or did he just pick it off a map as perhaps the least-known Central American country he could come up with?

A. STEPHEN BREWER
Ojai, CA

The author replies. . . .

I stand not corrected but better informed. I knew the languages to be English, Spanish and "Indian languages" without knowing any relative proportions. It pleases me that this—of all things in the story—should seem unreal while the rest, apparently, felt real!

MARK RICH

Dear Stan, Spider & Jeanne Robinson:

Well, they did it again. I just got my copy with the last installment of *Starmind.*

Spider and Jeanne killed off most of the real good guys and made me feel good about it. Incredible!!

---

[3] There is even some evidence that the spotted owl prefers more open habitats. The closed canopy of an old growth forest reduces the amount of underbrush and hence the number of rodents available for spotted owl power lunches.

However, not too surprising, one of my most memorable experiences reading science fiction (about 40 of my 47 years) was the anthologized version of the second chapter of *Mindkiller.* Spider had the two protagonists in what seemed to be a lose-lose situation. There didn't seem to be any way out, and, at the time I was reading it the first time, there was a very large amount of shit being published wherein the major theme seemed to be "There is no way to win, there is no way to break even, it is impossible, and there is no use even to try." I was already a Spider fan, and as I read it, towards the end I was thinking "My God! Spider is writing something like this? How dare he."

And in the last paragraph they fixed it. The sun came out and everything was all right. A truly incredible feeling. And very very memorable.

This one wasn't *quite* as much of a lift, but very much along the same lines. Thank you Spider and Jeanne very much. The only complaint that I have about you is that you don't write enough. And that you gave up the book column. While you were doing it, I found that I was turning to the book reviews first when I got my copy of *Galaxy,* and then *Analog.* I miss you.

And thank you Stan, for publishing what Spider writes. If he is not the best writer going today, I would be hard pressed to find a better.

JIM HURLBURT

911 S. 42nd Ave. Apt C
Yakima, WA 98908

* * *

Dear Dr. Schmidt:

Spider and Jeanne Robinson's *Starmind* was wrapped up nicely in your November '94 issue. Its vision of humankind rising to the stars is reminiscent of the ending to Arthur C. Clarke's classic *Childhood's End*—even to the quasi-religious tone, which suggests the millennarian Christian concept of the Rapture as much as it does the "birthing" image explicitly laid out by the authors. The conspiracy against the Starmind, too, evokes millennarian imagery, of the final battle between the forces of God and those of Satan—with the Fireflies cast in the role of God, or close enough.

A couple of gripes, though.

First, of course, is the continued use of the term "symbiote" (capitalized, of course, in this story) in place of the word "symbiont." Hal Clement started it, apparently, in *Needle,* decades ago; in his foreword to that novel's less-famous sequel, *Through the Eye of a Needle,* he commented on his mistake, and on its propagation in SF. I suspect it is now too well established to be extirpated, but I wish it weren't so popular when the correct term scans as well.

Second, and much more seriously, the babblescience about a genetic transformation making humans "transparent to gravitons" and thus "immune to gravity," followed by the generation of "a special kind of antigravitons"—"designed" to affect only transformed human tissue and bring about an ascent to space—was pretty hard to swallow. Leaving out the fact that (as far as I know, anyway) even gravitons have yet to be unambiguously detected, the idea of "anti-gravitons" goes against the quantum-mechanical understanding of what gravitons are supposed to be, which holds that like photons, they are their own antiparticles. Then, the idea that a merely *genetic* change in human tissues could bring about the fundamental change in quantum properties being described is rather akin to the alchemical idea of turning one element into another by chemical reactions. (If anything, it's an even more drastic leap of the imagination; at least the alchemists expected to start and end with normal matter!) *Analog* usually sticks to "harder" science than this (even the long-established convention of faster-than-light travel, for instance, is usually justified with some sort of nod to relativity). And surely the Robinsons, with their demonstrated talent, could have found a more realistic-sounding method of attaining the Starmind.

ERIC B. LIPPS

328 Van Duzer Street
Staten Island, NY 10304

One of the authors replies....

Dear Stan,

Jeanne being out of town, I've managed to mislay the first *Brass Tacks* letter you forwarded to us, so I can't address our reply to the gentleman in question by name. But here goes:

As to the first point: "Symbiont," according to the *American Heritage Dictionary* means "an organism living in a symbiotic relationship with another." But we were referring to "Symbiote," that is, an organism *capable of becoming* a symbiont under the proper conditions. A Stardancer in Symbiosis is a symbiont, as is the Symbiote of a Stardancer in Symbiosis—but the gunk itself is only a Symbiote. Clear?

As to the second point, the implausibility of antigravitons: today's Vancouver *Sun* (4 October 1994) contains a report that the National Research Council has now determined that "the Universe is half to two-thirds as old as previously believed," and that therefore "there may be some sort of 'repulsive' force counteracting gravity and slowing the expansion of the Universe," possibly Einstein's too-hastily-recanted "cosmological constant." Well, that's our antigravitons they're talking about, OK? (Let this be a lesson to all those who think they've spotted errors based on something a physicist told them.)

Now that *second* letter, from Richard Boothe, about saying "The Mad Hatter" when we meant "the White Rabbit"—there he's got us dead to rights. We'll try to correct the error in the hardcover.

SPIDER ROBINSON ■

EDITOR'S NOTE: If you would like your address to appear with your Brass Tacks letter, then please type the address at the bottom *of the letter, after your signature.*

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UPCOMING EVENTS Anthony Lewis

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13-16 July

NASFiC (North American Science Fiction Convention) combined with Dragoncon at Atlanta Hilton & Towers, Atlanta, Ga. Guests of Honor—George Alec Effinger, Harlan Ellison, Bjo Trimble, Michael Whelan, and Timothy Zahn. Registration—$50 until 15 March, $55 until 15 June, $60 at the door. Info: NASFiC, PO Box 47696, Atlanta GA 30362-0696. (404) 925-0115 (M-F).

21-23 July

CONVERSION XII (Alberta SF conference) at Glenmore Inn, Calgary, Alta. Guest of Honour—Lois McMaster Bujold, TM—Greg Bear. Registration—C$35 to 5 July, C$40 at the door. Info: Conversion XII, PO Box 1088, Station M, Calgary, Alberta T2P 2K9, Canada. (403) 271-0662.

24-28 August

INTERSECTION (52rd World Science Fiction Convention) at Scottish Exhibition & Conference Centre, Glasgow, Scotland. Guests of Honour—Samuel R. Delany & Gerry Anderson, Fan Guest of Honour—Vin% Clarke, TMs—Peter Morwood & Diane Duane. Registration—£80/US$125/CDN$160/DM210/DFI 240, Supporting—£15/US$25/CDN$30/DM40/DFI 45. At-door rates not set as of the time of this listing but will be greater than current attending rates. This is the SF universe's annual get-together. Professionals and readers from all over the world will be in attendance. Talks, panels, films, fancy dress competition—the works. Join now and get to nominate and vote for the Hugo Awards and the John W. Campbell Award for Best New Writer. Info: Intersection, AdMail 336, Glasgow G2 1BR, UK or intersection@smof.demon.co.uk ; Intersection, Box 15430, Washington DC 20003-4030, USA. (301) 345-5186 voice/fax.

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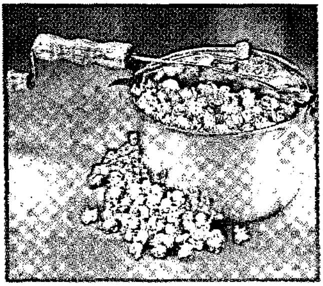

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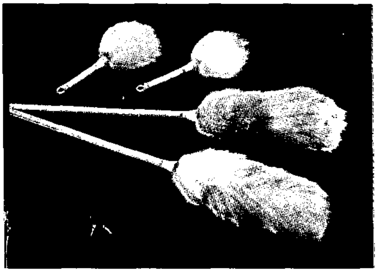

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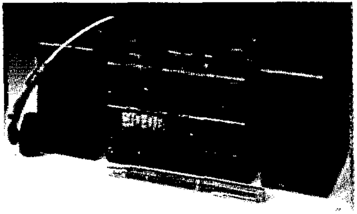

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